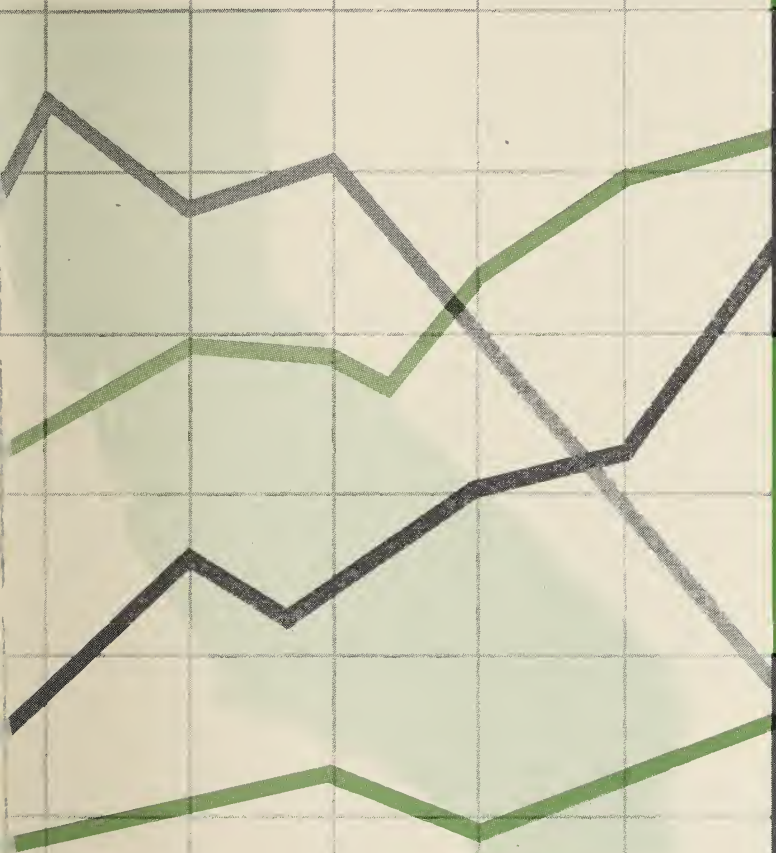
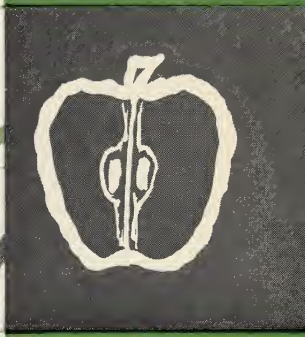
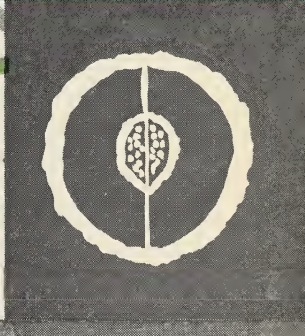
Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

'RENDS for MAJOR
CALIFORNIA CROPS

ields, Acreages, and Production Areas







ERALD W. DEAN • C. O. McCORKLE, Jr.

CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

CIRCULAR 488

1 North Coast

2 North Central

3 North East

4 Central Coast

5 Sacramento Valley

5A San Joaquin Valley

6 Mountain Area

8 Southern California

THESE ARE THE CROP-REPORTING DISTRICTS

INTRODUCTION

Information often requested is brought together here and summarized to show trends in the yields, acreages, and production areas of forty-two major California crops. The graphs show *what* the trends have been; the text tells *why,* summarizing the major factors behind the changes.

The report serves two purposes: it records long-time trends and short-run changes, and it aids in understanding future cropping possibilities. No attempt is made to forecast trends, except for some very short-run changes. Projection of future crop patterns must await a more detailed study, for experience has shown that simple extension of trends is misleading.

California produces too many crops for all to be covered here. This report is therefore restricted to crops that individually grossed more than eight million dollars in 1955—but these add up to slightly over 90 per cent of the total crop value for that year. Completeness of coverage varies, of course—from nearly all of citrus fruits and tree nuts, through 93 per cent of noncitrus fruits and 90 per cent of field crops (including food and feed grains), to only 84 per cent of vegetables.

The figures herein vary in accuracy. They are quite exact for crops regulated by government programs (sugar beets, cotton, etc.) or by industry-wide programs (cling peaches, lemons, etc.); fairly exact for crops grown in quite restricted areas (mostly vegetables) and for crops that are slow in reaching production (tree crops); and least exact for crops grown throughout the state and subject to sizable year-to-year changes (barley, alfalfa, and several other field crops). The last group is extremely difficult to estimate with precision, and government agencies lack the resources to take a complete census of each crop. The sampling

methods devised as the only practical alternative are subject to some error.

Because the figures on year-to-year changes cannot be considered precise, the discussion generally follows longer trends. However, certain year-to-year changes are quite pronounced and are clearly explainable by unusual weather, acreage controls, or widespread incidence of pests or disease.

The periods for which figures are available vary—with the crop and with counties or crop-reporting districts. Fruit and nut crops, which require relatively long periods for accurate depiction of trends, fortunately have figures extending back to 1920. Annual crops are shown for shorter periods (vegetables from 1933, and some field crops only from 1938).

To indicate broad shifts in producing areas and to compare the importance of areas, trends are shown for principal districts. However, the method of division—by crop-reporting districts—is not completely satisfactory: It presents a broad picture, but the reader must remember 1) that the districts follow county lines rather than climatic or economic boundaries; 2) that production of certain crops is extremely localized, even within a district or a county or a portion thereof; and 3) that crops may shift within a crop-reporting district. However, such shifts are pointed out in the text.

The accompanying map shows the crop-reporting districts of California. The graphs omit districts 1, 2, 3, and 6, which together account for less than one twentieth of the total value of all farm products sold in California. An occasional important crop in those areas is discussed in the text.

ACKNOWLEDGMENTS

The source of most of the data used herein is the California Crop and Livestock Reporting Service. The authors wish to thank personnel in that agency who made certain unpublished county data available as a supplement to published materials. In the Department of Agricultural Economics, Davis, Roger Fox was especially helpful in compiling data and preparing graphs. Finally, the authors wish to acknowledge the assistance of University of California staff members and agricultural leaders throughout the state who provided information of help in interpreting the material. Of course, the authors accept final responsibility for any errors of fact or interpretation.

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THE AUTHORS:

Gerald W. Dean is Assistant Professor of Agricultural Economics and Assistant Agricultural Economist in the Experiment Station and on the Giannini Foundation. C. O. McCorkle, Jr., is Associate Professor of Agricultural Economics and Associate Agricultural Economist in the Experiment Station and on the Giannini Foundation.

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APPLES

Changes in bearing and nonbearing acreage

California produces less than 10 per cent of the nation's apples, but ranks among the top four states in production; in the West it is second only to Washington. Both summer and fall varieties are produced. The principal summer variety is Gravenstein. Before World War II about half of the California apple crop was processed. Over 80 per cent of that half was dried. Apple production continues to exceed demand in the fresh outlets—so prices are not favorable to growers, and fresh sales of California apples have declined to less than one third of production. Today nearly 80 per cent of the apples processed are dried or are canned as applesauce, in about equal proportions.

The bearing acreage of apples in California has declined steadily since 1926 and now stands at less than half the level reached in that year. Bearing acreage has declined in all producing districts in the state—for a number of reasons, but most important has probably been the presence of more profitable alternatives. Contributing factors have been insufficient winter chilling and rising water costs.

Nonbearing acreage declined drastically from 1920 to 1937, remained relatively stable through the war period, and has fluctuated moderately in the recent decade.

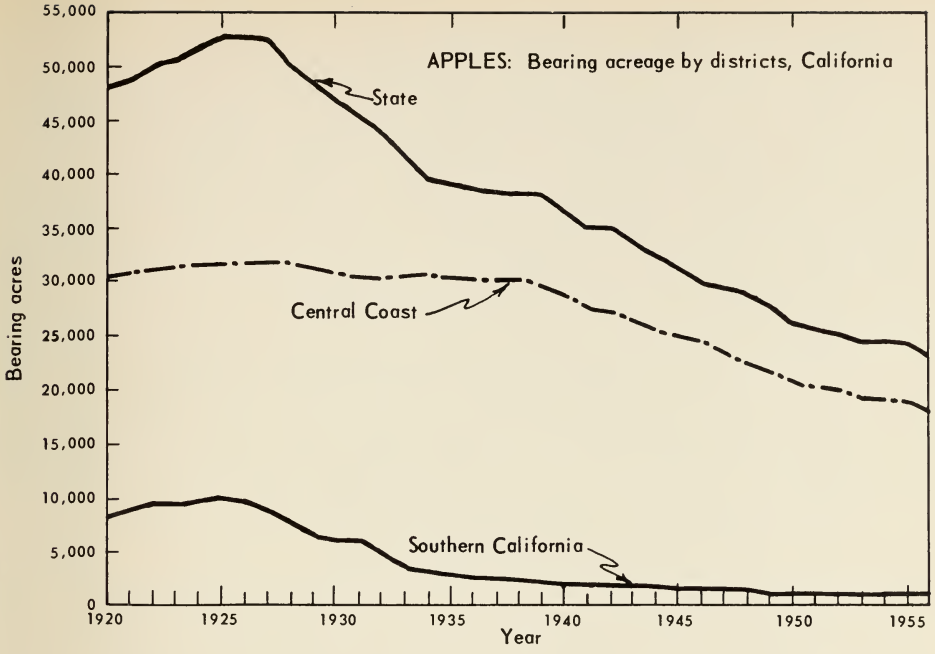
Shifts in location of production

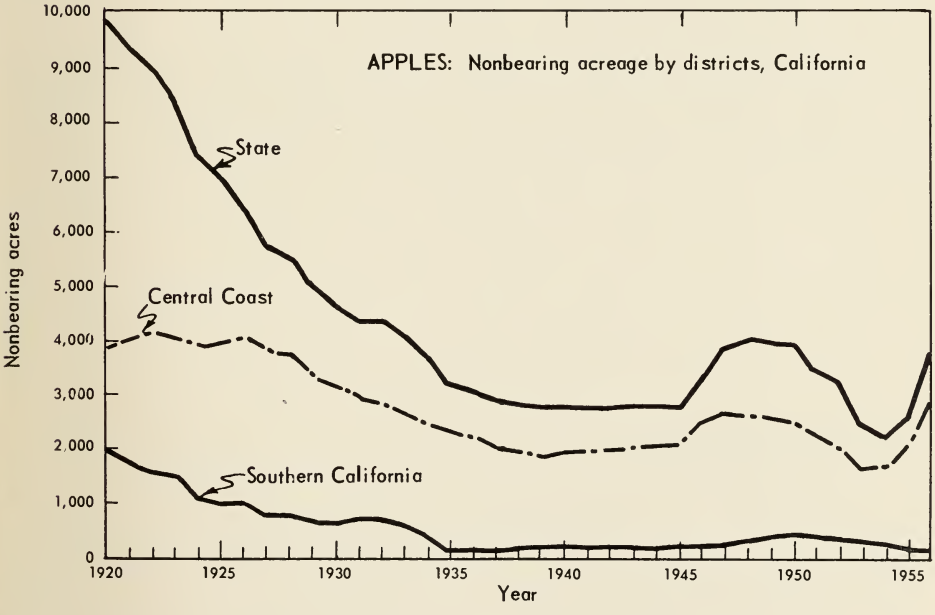
Apples require a growing season that is long and cool, permitting slow development of the crop. High summer temperatures cause sunburn and some damage to the fruit. Thus, the interior valleys and southern California are considered suitable apple districts only at higher elevations with moderate summer temperatures and sufficient winter chilling.

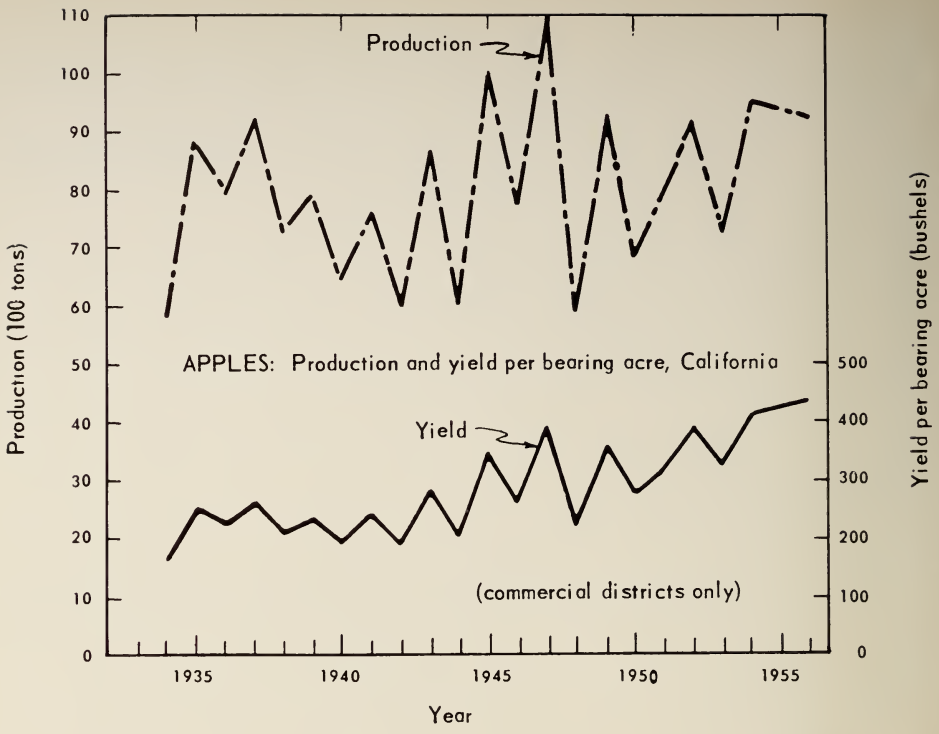
These requirements have centered the apple industry in the Sebastopol area of Sonoma County and the Watsonville area of Santa Cruz County, where about 85 per cent of the total value of apples in California is produced. Commercial acreage is found in several foothill counties from Butte south through Tulare, and also in the Yucaipa district, though the effects of moderate winters on yields have drastically reduced acreage in the southern counties. In both the north coast and foothill districts there has been a significant shift to Red and Double Red Delicious, both fresh shipping varieties. Some drying varieties have been topworked to shipping varieties. Apples produced in the southern counties have favorable local markets. Bearing acreage in the central coast counties has gradually declined. Nonbearing acreage, however, has increased in the last three years, primarily reflecting plantings of new varieties. In southern California both bearing and nonbearing acreage continues downward.

Trends in yields and production

Yields per acre have increased since about 1940. The increase has offset declining acreage so that total production is little affected. Since apple trees tend to bear heavily in alternate years, yields and total production fluctuate greatly from year to year. The relatively low level of


APPLES: Bearing acreage by districts, California
State
Central Coast
Southern California
Bearing acres
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


APPLES: Nonbearing acreage by districts, California
State
Central Coast
Southern California
Nonbearing acres
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year



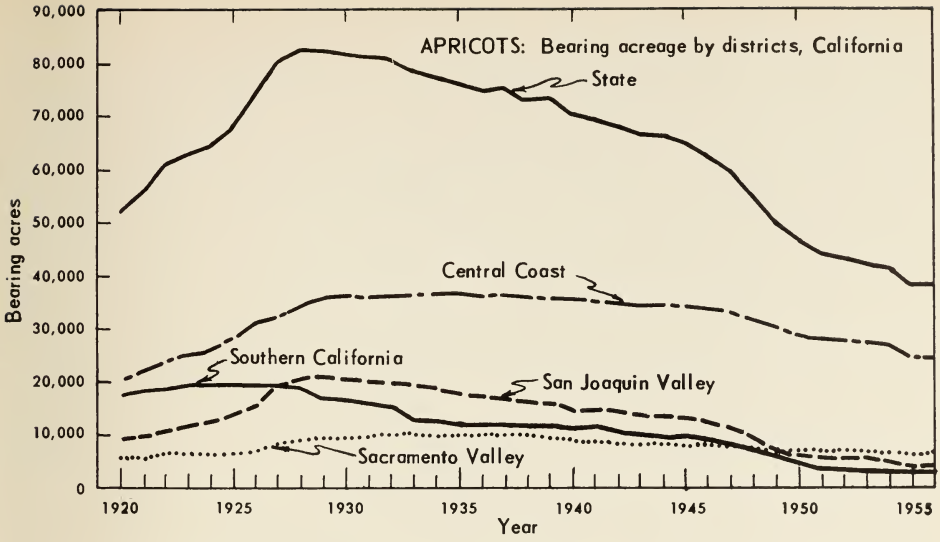
yields in the mid-thirties mainly reflects poor care of orchards because of low prices. Recent increases in yields primarily reflect improved care of orchards and some shift to heavier-yielding varieties. Potential sources of future yield increases are virus-free rootstocks and new varieties.

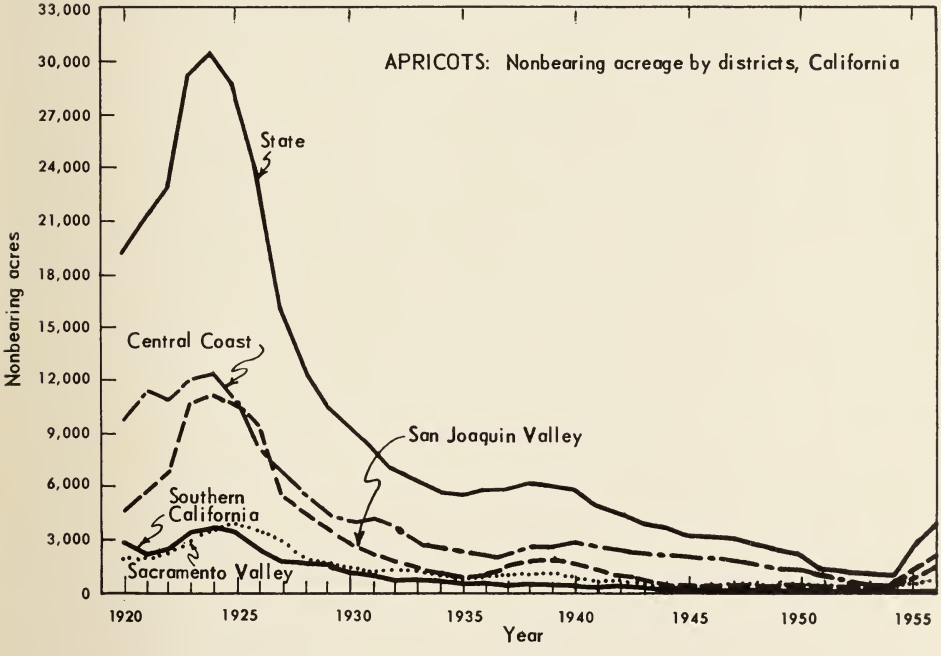
APRICOTS

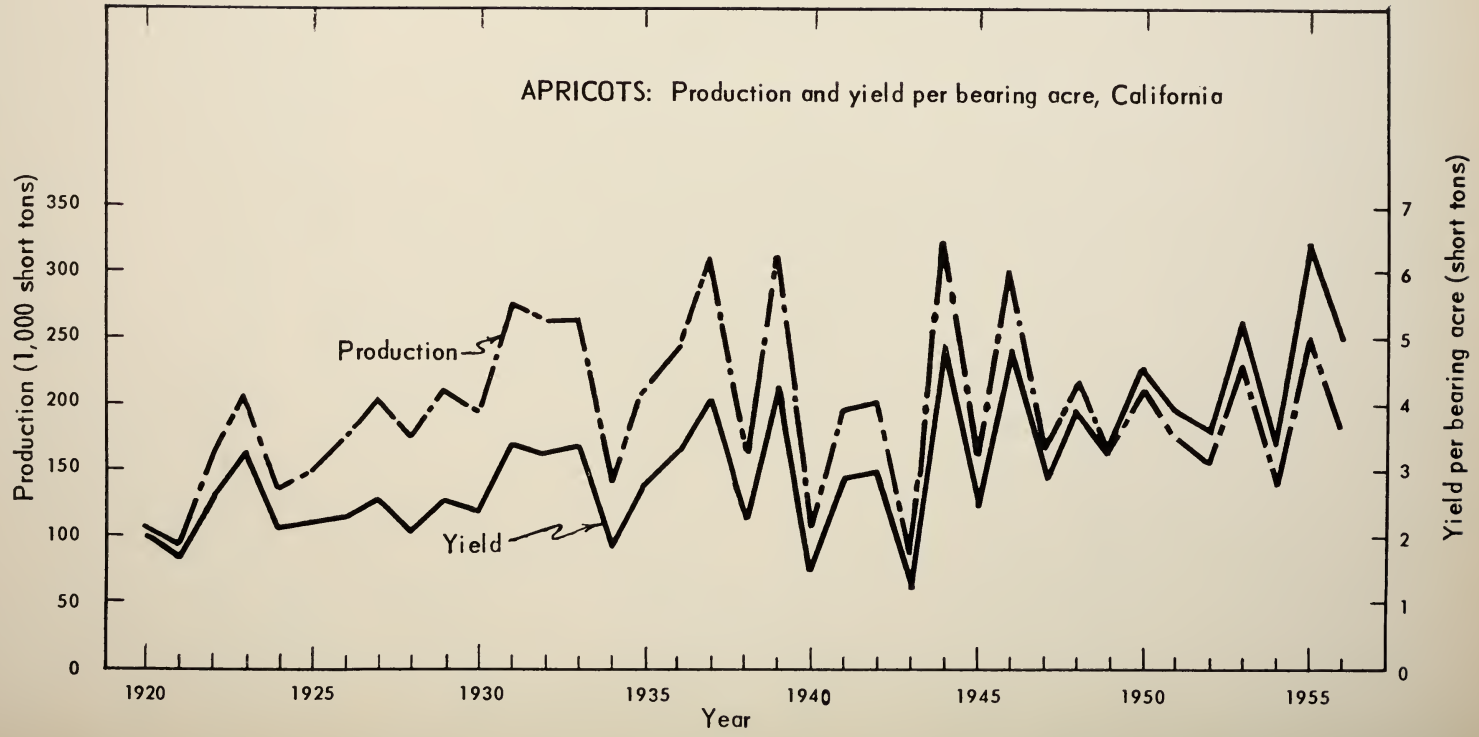
Changes in bearing and nonbearing acreage

California produces over 90 per cent of the apricots grown in the United States, of which about 10 per cent is sold fresh. The fresh product is primarily from producing areas with climates favoring early maturity. Most of the California crop is canned or dried; production in other states primarily enters fresh markets. Out-of-state production is late enough not to compete with California fresh shipments.

In the early and mid-twenties heavy planting of new trees was encouraged by


APRICOTS: Bearing acreage by districts, California
State
Central Coast
Southern California
San Joaquin Valley
Sacramento Valley
Bearing acres
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


APRICOTS: Nonbearing acreage by districts, California
State
Central Coast
San Joaquin Valley
Southern California
Sacramento Valley
Nonbearing acres
33,000
30,000
27,000
24,000
21,000
18,000
15,000
12,000
9,000
6,000
3,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


APRICOTS: Production and yield per bearing acre, California
Production (1,000 short tons)
Yield per bearing acre (short tons)
Production
Yield
Year
0
50
100
150
200
250
300
350
1
2
3
4
5
6
7
1920
1925
1930
1935
1940
1945
1950
1955

high grower returns for dried fruits in export markets. During this expansion, apricots were planted in some areas not well adapted to their production. Bearing acreages have declined steadily since the late twenties. Low returns to growers during the depression years contributed to the steady decline in bearing and nonbearing acreage. The rate of decline increased as a result of reduced plantings during the war years and extensive pulling of older trees. Nonbearing acreage continued to decline until 1955. Since then, increases have been significant.

Shifts in location of production

The Central Coast area, specifically the Santa Clara Valley extending south to the Hollister district, has been predominant in apricot acreage for 30 years. The climate is largely responsible. The apricot, an early bloomer, is subject to severe damage where spring frosts are common, and is subject to quality loss where summer temperatures are high. Cold locations or areas with frequent spring and summer fog are also unsuitable. Areas near San Francisco Bay, particularly the sheltered valleys in Santa Clara, Contra Costa, Solano, San Benito, and Monterey counties, have thus been commonly selected. Acreage in the Central Coast area has declined, though it still accounts for well over half of the state's total acreage. Causes of the decline have been subdivisions and, in some localities, increased interest in vegetable production.

Acreage in the Sacramento Valley (chiefly at Winters and Fairfield) has remained nearly constant for the last ten years at only slightly less than peak acreage. These areas are the early shipping districts, characterized by relatively warm springs that ripen fruit before the high summer temperatures.

The San Joaquin Valley area rose to major importance in the early thirties and then declined steadily, though acreage remains significant in the Brentwood and Tracy districts. Ignorance of the limited adaptability of apricots was probably responsible for this early expansion and subsequent decline. Recent increases in nonbearing acreage in the San Joaquin Valley are confined to the Tracy-Patterson district, where interest is largely in production for processing. It is questionable whether this district can mature fruit as early as such areas as Winters, but may possibly produce ripe fruit earlier than the Brentwood region.

Southern California, an important producer of apricots before 1930, is now less important. Principal southern California districts were near Hemet, in Riverside County, and in southeastern Ventura County, near Moorpark. Interest remains low in those areas, though new plantings have recently increased in all other districts, particularly in the northern San Joaquin Valley.

Trends in yields and production

Apricot yields vary greatly from year to year. Alternate bearing is partly responsible; so is unfavorable weather during blossoming or ripening. Yields have increased gradually, and more markedly since the early forties. The reason is partly that commercial acreage is concentrated in better-adapted areas and that old trees have been pulled; an additional factor may be the accumulated results of many minor improvements in cultural practices.

Production from year to year strongly reflects the variation in yield. The lack of a definite trend in production indicates that decline in acreage has been approximately offset by increasing yield. With some new planting in favorable districts and the bulk of removals in areas where trees are relatively old, some increase in total production might be forthcoming, but the 300,000-ton crops experienced in the mid-forties are not probable in the near future.

SWEET CHERRIES

Changes in bearing and nonbearing acreage

Commercial production of sweet cherries in the United States centers in two areas: the Pacific Coast (California, Oregon, and Washington) and Michigan. Utah, Idaho, Montana, and New York produce minor quantities. California production accounts for 30 to 40 per cent of the value of U. S. sweet cherry production. These cherries are used primarily for fresh consumption, though significant quantities are canned or brined. The latter are used to produce maraschino cherries. Sour cherries are also produced in the United States, though mainly east of the Rocky Mountains, for pie fruit.

The bearing acreage of cherries in California rose rapidly between 1920 and the peak year of 1938 (almost 15,000 acres) and then declined steadily until 1950 (to about 9,500 acres). Nonbearing acreage peaked in 1926, declined drastically until the mid-forties, and has since expanded rapidly, reflecting favorable grower returns. Continuing favorable prices can be expected to result in further plantings and increased production, barring a drastic change in rate of pullings.

Shifts in location of production

The Santa Clara Valley, on the Central Coast, and the Lodi–Linden district, in the San Joaquin Valley, have been the centers of California's cherry production. Small acreages are reported in Alameda, Contra Costa, El Dorado, Monterey, Napa, Riverside, Sacramento, Santa Cruz, Solano, Sonoma, and Sutter counties. The rather exacting climatic and soil requirements of the cherry tree are met most readily in selected locations within these counties. Soils should be the light and well-drained loams characteristic of alluvial sedimentary soils. Some foothill soils are considered acceptable; clay and adobe soils generally are not, though cherries are being grown on heavier soils on rootstocks adapted to them. The physical requirements of the cherry tree make readily apparent the development of a major segment of California's cherry industry in the Santa Clara Valley. But a rapid industrial and urban growth on favorable sites in this area obscures its future as a cherry producer. There has been some new planting there, near San Martin and Gilroy, but there is some doubt that bearing acreage will be maintained.

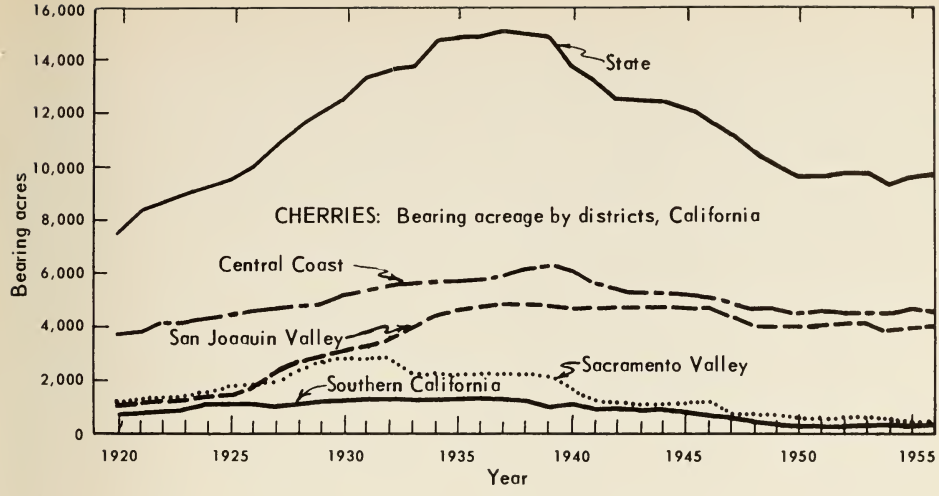
The Lodi–Linden area, in the San Joaquin Valley, is one of the oldest cherry-growing districts in the state, and expanding rapidly. Soils and climate there are particularly well suited to cherry production. Growers moving from the Santa Clara Valley are responsible for much of this expansion. The area south of the Delta—from Tracy–Patterson, on the west, to Manteca–Turlock, on the east—may conceivably become an important cherry-producing region.

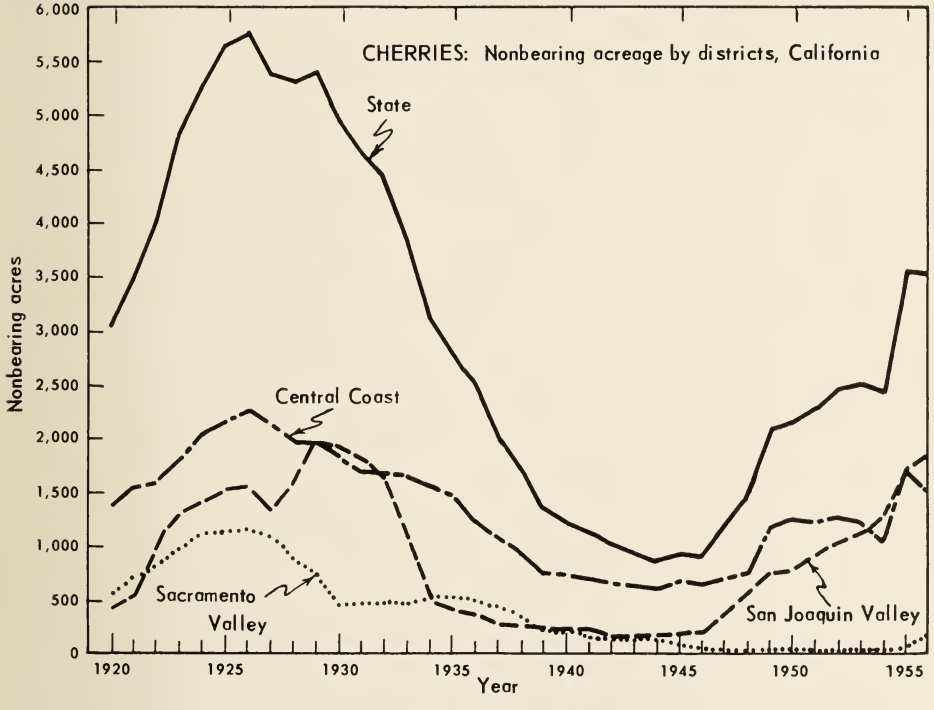
In southern California, Yucaipa and Beaumont have been important in production for the local market and fresh shipment, but have gradually declined. Attempts are being made to increase production, primarily for local sale, through varieties better adapted to this area.

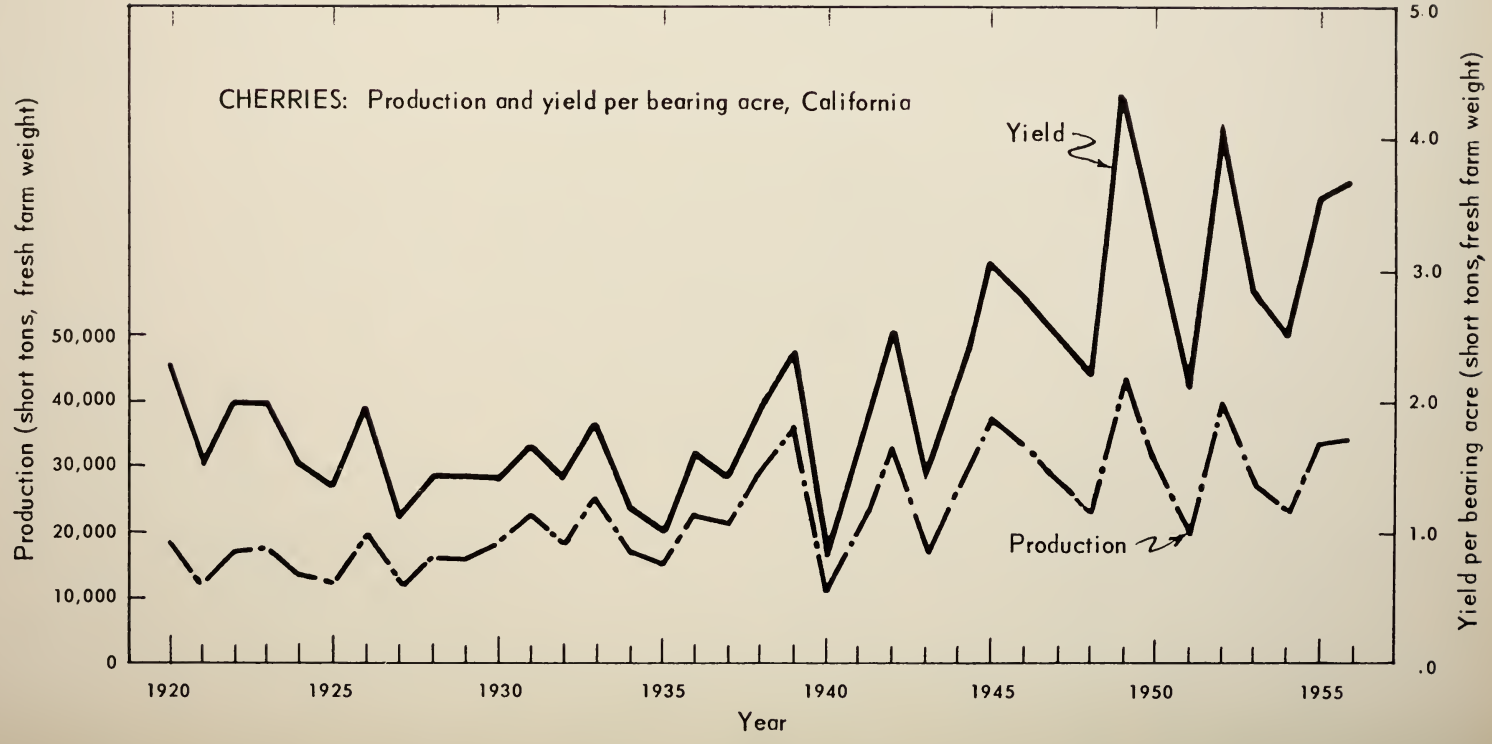
In the Sacramento Valley, limited acreage suitable for cherries is found along the Sacramento River, but higher returns from other crops have resulted in a continual decrease in acreage since 1930. No expansion is anticipated there.

Trends in yields and production

Yields of cherries fluctuate widely from year to year, primarily as a result


CHERRIES: Bearing acreage by districts, California
State
Central Coast
San Joaquin Valley
Sacramento Valley
Southern California
Bearing acres
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


CHERRIES: Nonbearing acreage by districts, California
State
Central Coast
Sacramento Valley
San Joaquin Valley
Nonbearing acres
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


CHERRIES: Production and yield per bearing acre, California
Yield
Production
Production (short tons, fresh farm weight)
Yield per bearing acre (short tons, fresh farm weight)
Year
0
10,000
20,000
30,000
40,000
50,000
.0
1.0
2.0
3.0
4.0
5.0
1920
1925
1930
1935
1940
1945
1950
1955

of weather conditions. Being an early fruit, cherries are subject to severe damage from frost at blossom time, and from rain during ripening.

Since the mid-thirties, yields of sweet cherries have increased at a rapid rate. The annual average yield in 1952–56 was 3.3 tons, compared with 1.7 tons in 1935–39. Improved disease recognition and control, soil and water management, and care of trees are important factors contributing to this increase. Future yield increases may come from recent plantings in areas well adapted to their culture. Still further increases may result as virus-resistant rootstocks and new varieties are introduced.

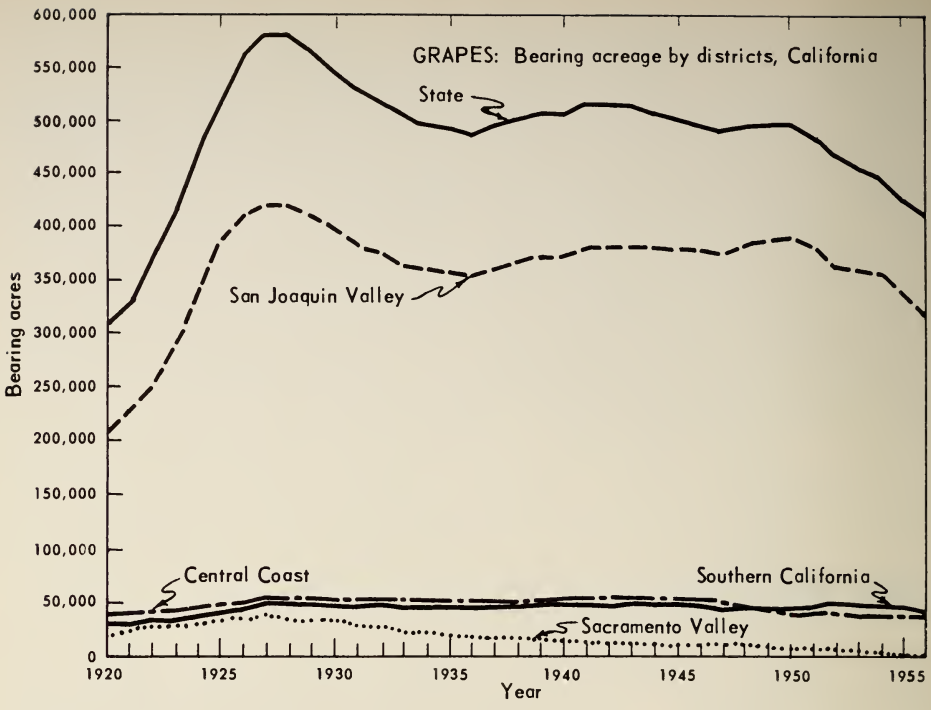
The rapid increase in yield has more than offset the reduction in bearing acreage, the net result being a gradual upward trend in total production. With nonbearing acreage almost 28 per cent of total acreage and the average yield rising, production of sweet cherries in California can be expected to increase. The large year-to-year fluctuations, however, prevent forecasting production for any given year.

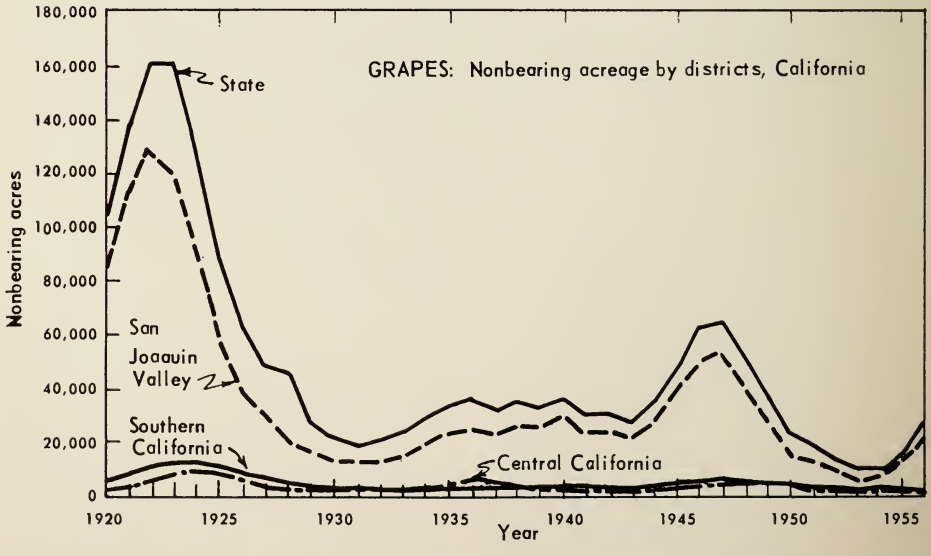
GRAPES

Changes in bearing and nonbearing acreage

California produces 90 per cent of the United States grape crop. Three general varietal classes are produced—raisin, wine, and table grapes. However, some varieties in raisin and table classes are multipurpose and may go to two or all three outlets, depending on relative supplies and prices. Hence, the several markets are highly interrelated. Developments in one segment of the industry are felt almost immediately in the other segments. From 1920 to 1956, raisin varieties composed over half the total California production; the remainder was about equally table and wine varieties. Since some table and raisin varieties go into wine, nearly one half of the annual grape crop is usually crushed for wine and brandy. Another 30 per cent goes to raisins, and the rest to fresh use. In recent years, only about 15 per cent of the California grape crop has been exported, mostly raisins exported under subsidy by the U. S. government.

There are only three or four years between planting and commercial production, so changes in bearing acreage lag but briefly behind changes in nonbearing acreage. High prices of fresh grapes from 1919 through 1922, and of raisins from 1919 through 1921, tremendously stimulated California nonbearing grape acreage in the early twenties. Then excessive supplies and depressed prices reduced new plantings. As a result, bearing acreage peaked in the late twenties, declined until the mid-thirties, and then held relatively stable as new plantings offset vine removals for about a decade. In the mid-forties, high prices encouraged new plantings, and nonbearing acreage again increased sharply. Prices and nonbearing acreage declined in the late forties, followed by a decline in bearing acreage since 1950. Depressed prices and burdensome surpluses in the postwar years can be traced partly to loss of the large prewar export market for raisins. Furthermore, domestic raisin consumption (per capita and total) has declined while fresh grape consumption has increased only


GRAPES: Bearing acreage by districts, California
State
San Joaquin Valley
Central Coast
Southern California
Sacramento Valley
Bearing acres
600,000
550,000
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


GRAPES: Nonbearing acreage by districts, California
State
San Joaquin Valley
Southern California
Central California
Nonbearing acres
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year

about 2 per cent. Even though per capita wine consumption in the United States has doubled since prewar years, this sector has not taken all the increased supplies at favorable prices. However, the decline in bearing acreage since 1950 has improved prices and outlook in the past two or three years, with the result that nonbearing acreage increased in 1955 and 1956. Restrictions on cotton acreage also released acreage for grapes in the San Joaquin Valley. Thus, bearing acreage can be expected to increase slightly in the next few years.

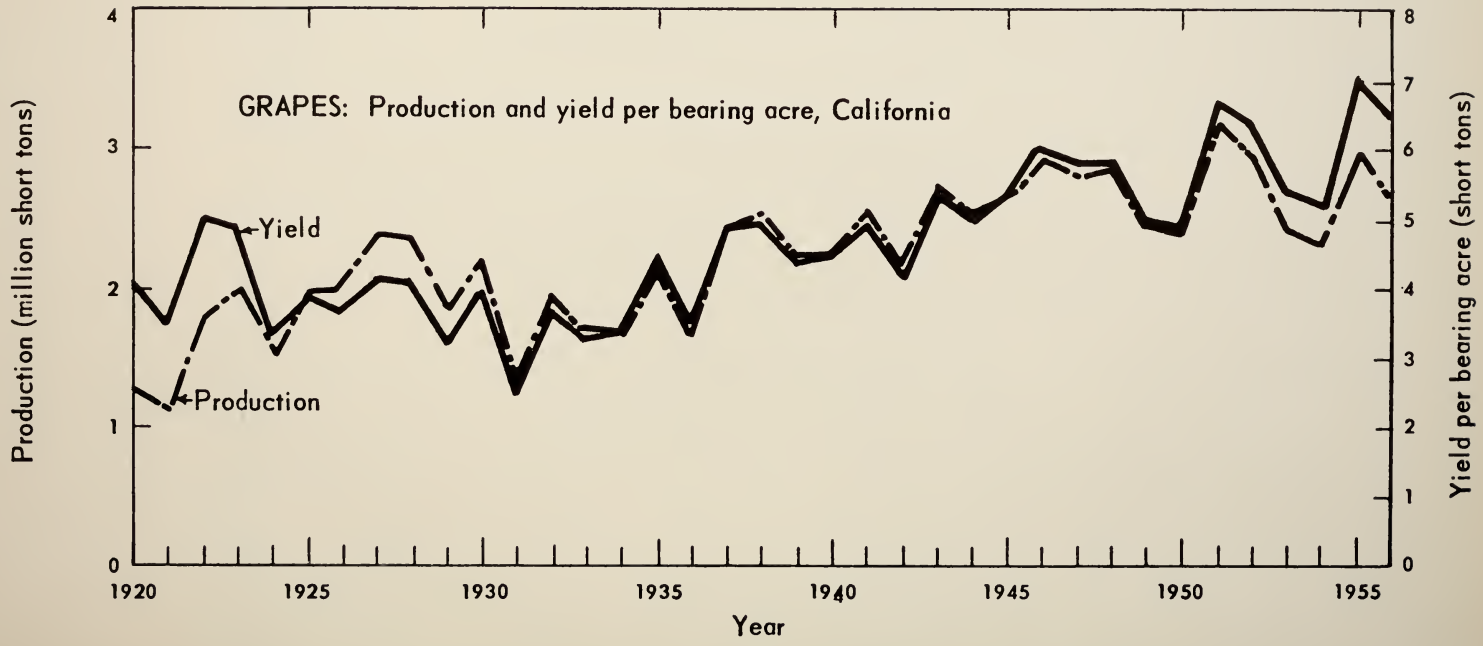
Shifts in location of production

The San Joaquin Valley is the heart of the California grape industry, centering in Fresno County and extending north into Madera County and south into Tulare County. Almost the entire state acreage of raisin varieties, a major acreage of table grapes, and many wine grapes are located in this region. The other major production area in the San Joaquin Valley is in San Joaquin, Stanislaus, and Merced counties, where large quantities of wine and table grapes are produced. Other important areas for wine grapes are the Central Coast areas of central Sonoma County and the Napa–St. Helena district, and the southern California districts near Ontario, in San Bernardino County. The major fluctuations in both nonbearing and bearing acreages have taken place in the San Joaquin Valley. Total bearing acreage in southern California has remained relatively static, though grape varieties have shifted significantly in the last decade. Large acreages of wine grapes have been pulled, but new acreage of early table varieties in the desert region has offset that decline. The Sacramento Valley (mainly the table and wine grape area of Sacramento County) has almost disappeared from the industry. Bearing acreage in the Central Coast area has declined moderately since the war, mostly in the relatively low-yielding wine grape areas of Sonoma County, and there especially on steep slopes or vineyards badly weakened by phylloxera.

Trends in yields and production

Grape yields have increased substantially since the early thirties, averaging over 6 tons per acre in the past few years —7 tons for raisin and table varieties, and about 4 tons for wine varieties. Increased use of irrigation, better disease control, planting on better soils, removal of marginal plantings, and increased plantings of high-yielding varieties have all contributed to higher yields. (Some consider that the increase in yields has been overstated; they attribute part of the greater production to vines added in vineyard borders and corners and not showing as additional acreage.) The general trend in total production has been upward, at least until about 1951. In the fifties, acreage declines were about offset by yield increases, so that average production has leveled off. Year-to-year changes in yields—mainly from variations in weather—are reflected directly in total production.

With new plantings up and vine removals slackening under recent favorable grape prices, bearing acreage may level out or increase. Yields per acre may increase somewhat, but probably not as rapidly as in the past. Total production may increase slightly in the next few years.

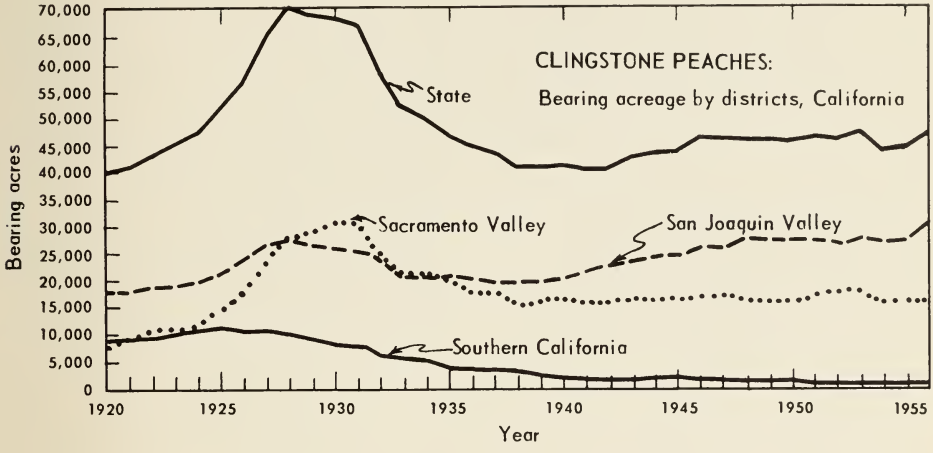

GRAPES: Production and yield per bearing acre, California
Yield
Production
Production (million short tons)
Yield per bearing acre (short tons)
Year
0
1
2
3
4
1
2
3
4
5
6
7
8
1920
1925
1930
1935
1940
1945
1950
1955

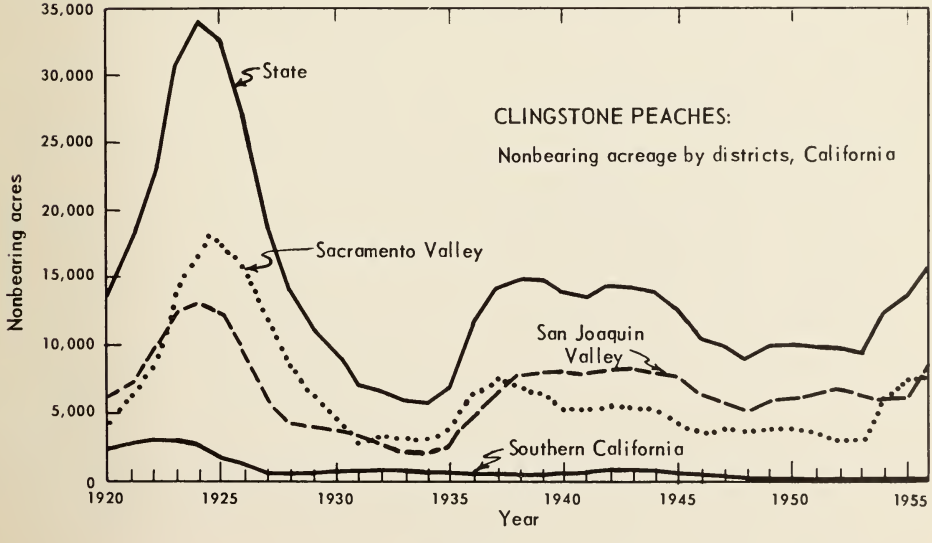
CLINGSTONE PEACHES

Changes in bearing and nonbearing acreage

Clingstone peaches come into bearing earlier than most other tree crops, usually in the fifth year. Hence, any change in total bearing acreage in the state in any year depends on the net balance between plantings about four years old and removals of old or diseased trees.

Heavy plantings in the early twenties caused a peak in nonbearing acreage in 1924, resulting in rapid expansion of bearing acreage in the late twenties. Consequent overproduction and low prices in





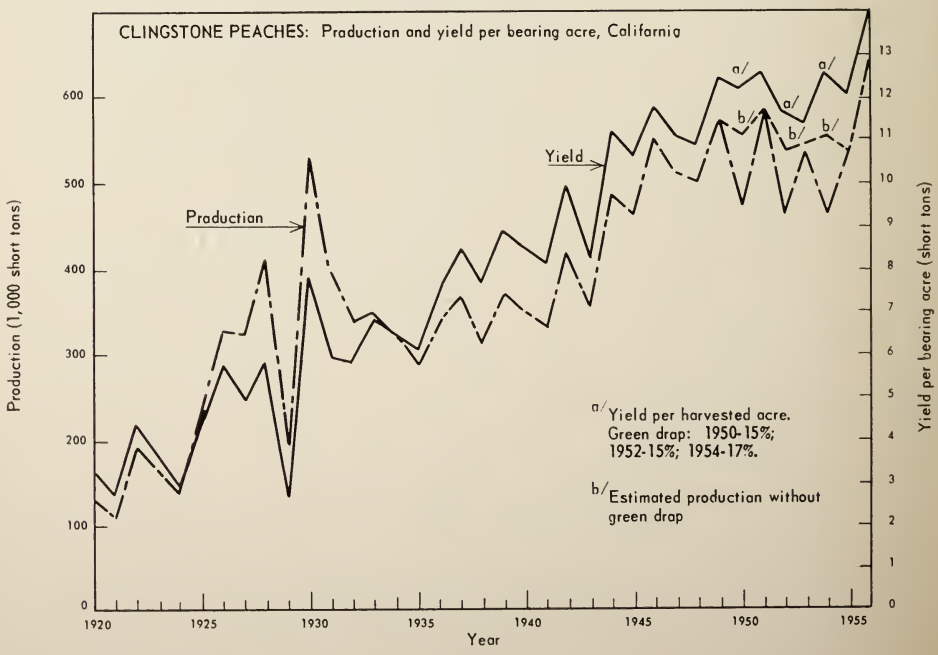
the late twenties and early thirties discouraged new plantings, and nonbearing acreage declined to a low of 6,000 acres in 1934. Nonbearing acreage has since increased, with the result that bearing acreage stabilized in the late thirties and then gradually increased. Increases in nonbearing acreage since 1954, resulting largely from favorable prices, indicate that bearing acreage will probably rise in the next few years.

Shifts in location of production

The major producing districts in California are almost totally confined to the interior valleys. Acreage in the Sacramento Valley centers at Marysville–Yuba City, extending northward to Live Oak and southward to Rio Oso along the Sacramento River. Three distinct districts are found in the San Joaquin Valley: Stockton, Modesto–Merced, and Kingsburg–Visalia–Lindsay. The southern California district consists of two relatively small commercial districts—one east of Redlands and one near Hemet.

The districts in the San Joaquin Valley are of major importance, accounting for nearly two thirds of the bearing acreage of clingstone peaches. Expansion in state acreage since 1940 can be accounted for entirely by increases in the San Joaquin Valley districts. Any further state expansion is likely to take place in these districts. Soils and climate there are well adapted to fruit production. The southern California areas have declined steadily and are now an insignificant portion of the state total. Low yields and small fruits have been major factors in this decline. Southern California clingstone peaches do not size well, and have always posed a marketing problem. Under preferential terms of the marketing order, southern California producers are allowed to market a peach of smaller diameter than producers in other areas are permitted. Delayed foliation may be the major cause of the low yields and small sizes. Lack of interest in new plantings in this area indicates that southern California will decline even further in clingstone peach production.

Heavy plantings in the twenties in the



Sacramento Valley resulted in a peak bearing acreage around 1930. Fewer new plantings and more removals reduced the bearing acreage in the Valley to around 16,000 acres in the late thirties. Heavy pulling in the early thirties reflects an inability of many producers to withstand the low prices of the depression period. Less important was the fact that the rapid expansion of the twenties included plantings on some sites not adapted to peach growing. Since the middle thirties, total bearing acreage of clingstone peaches in the Sacramento Valley has remained nearly constant. Possible expansion in the area is somewhat restricted by the acreage adapted to peach growing. The profitability of other crops, such as processing tomatoes, may also be a factor limiting future expansion of peach acreage in this region.

Trends in yields and production

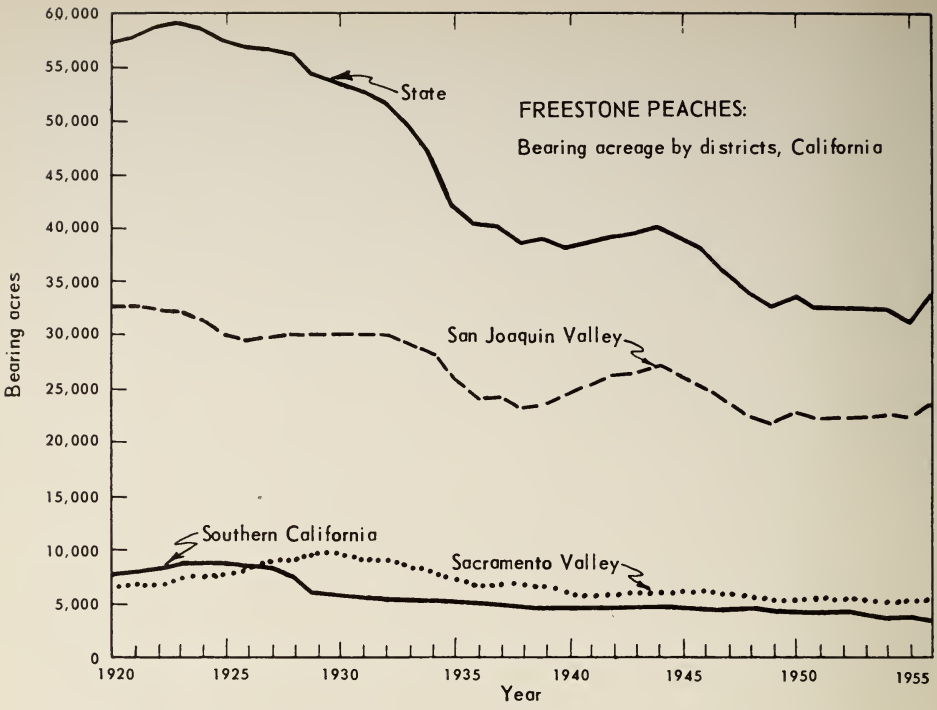
Yields per bearing acre of California clingstone peaches have increased strongly, nearly tripling in the last 30 years. The primary reasons are improved cultural practices, such as disease control, irrigation management, and fertilization. However, improved varieties and younger orchards also exert a considerable influence on yields. Shifts of bearing acreage into the high-yielding districts of the San Joaquin Valley, as indicated previously, also increase state average yields. Year-to-year variations in yields are caused mainly by weather variations and some tendency for alternate bearing.

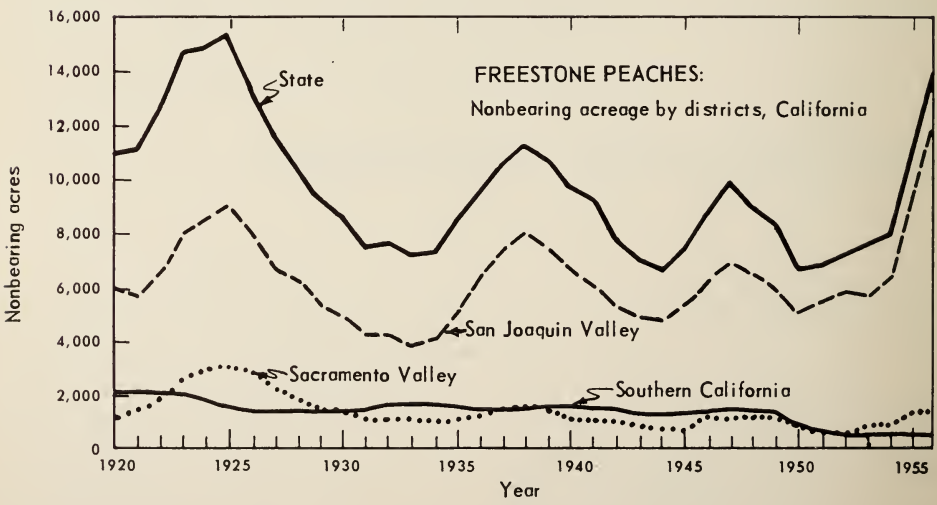
During the twenties, both bearing acreage and yield increased, resulting in a production peak in 1930. Between 1930 and 1935 acreage declines more than offset yield increases, with total production reduced. Since the late thirties, with both yield and bearing acreage increasing, total production has increased. Production will likely increase further, from prospective increases in both bearing acreage and average yields.

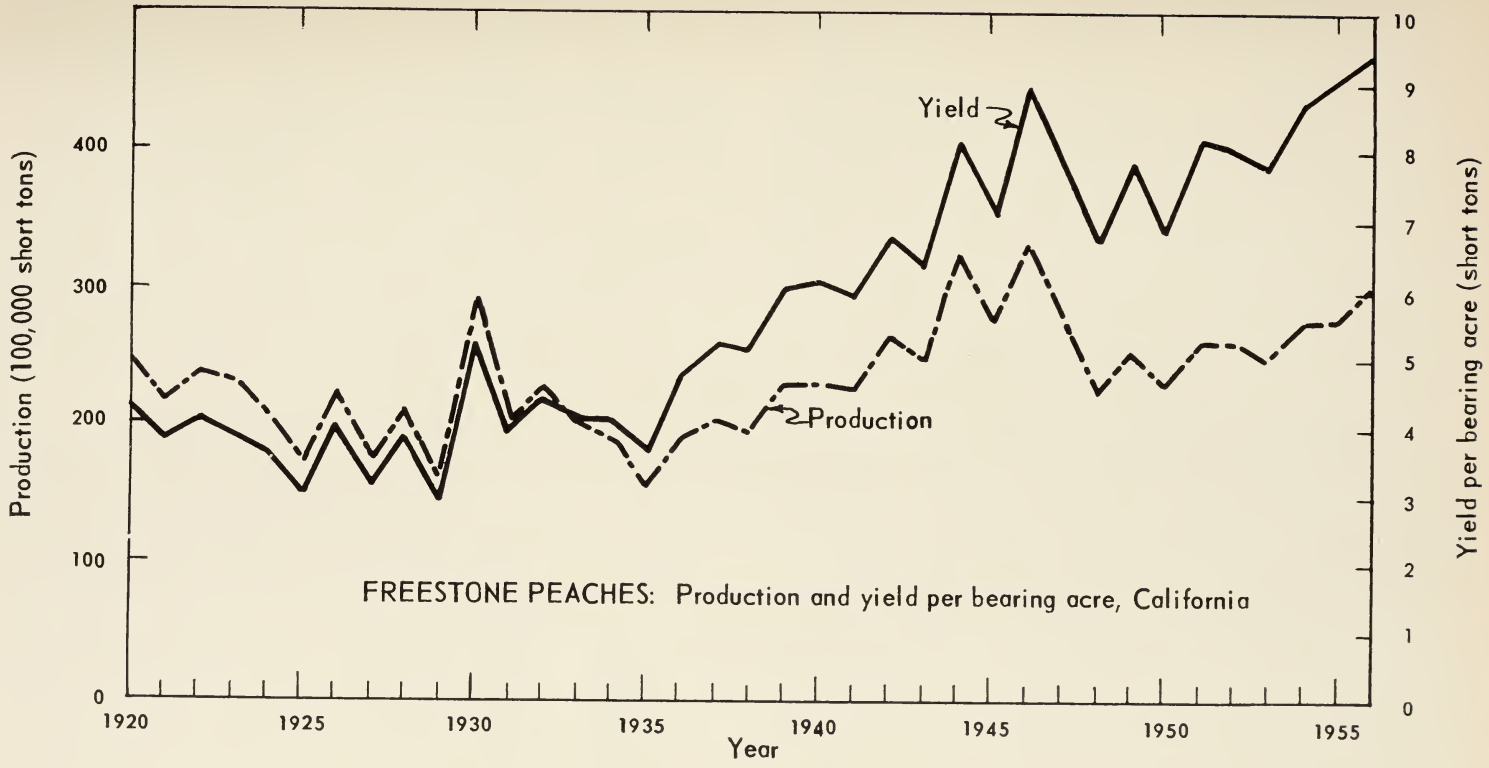
FREESTONE PEACHES

Changes in bearing and nonbearing acreage

For the U. S. as a whole, most freestone peaches move into the fresh market. In California, in contrast, about 55 per cent of the freestone crop is used for drying or canning, although the trend is toward a greater proportion in the fresh market. Prices received by California producers have been lower than those obtained by producers in other states. The shift toward more fresh shipment in California has narrowed this price gap. Low relative prices partially explain a downward trend in bearing acreage from the early twenties to late thirties. Sharp price declines discouraged new plantings and increased the rate of orchard removals. Stronger prices in the middle thirties encouraged some new plantings and allowed bearing acreage to stabilize from about 1938 to the end of World War II. After a brief postwar decline, bearing acreage again stabilized—at about 32,500 acres. Increases in nonbearing acreage in 1955 and 1956 indicate a probable future increase in bearing acreage.


FREESTONE PEACHES:
Bearing acreage by districts, California
State
San Joaquin Valley
Southern California
Sacramento Valley
Bearing acres
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


FREESTONE PEACHES:
Nonbearing acreage by districts, California
State
San Joaquin Valley
Sacramento Valley
Southern California
Nonbearing acres
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1920
1925
1930
1935
1940
1945
1950
1955
Year


Production (100,000 short tons)
Yield per bearing acre (short tons)
Yield
Production
FREESTONE PEACHES: Production and yield per bearing acre, California
Year
0
100
200
300
400
0
1
2
3
4
5
6
7
8
9
10
1920
1925
1930
1935
1940
1945
1950
1955

Shifts in location of production

Most of the decline in bearing acreage of California freestones has been in the San Joaquin Valley districts (Fresno–Porterville and Modesto–Merced), though the Sacramento Valley districts (principally Winters and Fairfield) and southern California (Redlands, Banning, and Ontario) have also declined. Just as most of the decline was in the San Joaquin Valley, any future expansions are expected to take place there. Recent increases in the Valley have been chiefly in Fresno, Kern, and Tulare counties, where early-maturing varieties command a premium price. The San Joaquin Valley has a seasonal advantage in the fresh market, primarily because of a relatively long growing season.

Trends in yields and production

Little trend in yields of California freestone peaches can be observed from 1920 to 1935. Improving prices during the late thirties and World War II led growers to adopt improved cultural practices (such as better disease control), substantially increasing yields. Since World War II, yields have been highly irregular; only since 1954 have they attained the previous record high of 1946. Future shifts to new early-maturing varieties may even reduce yields of freestones, but price advantages are expected to more than offset any yield reduction. Year-to-year yield fluctuations result primarily from weather variations and a slight tendency toward alternate bearing.

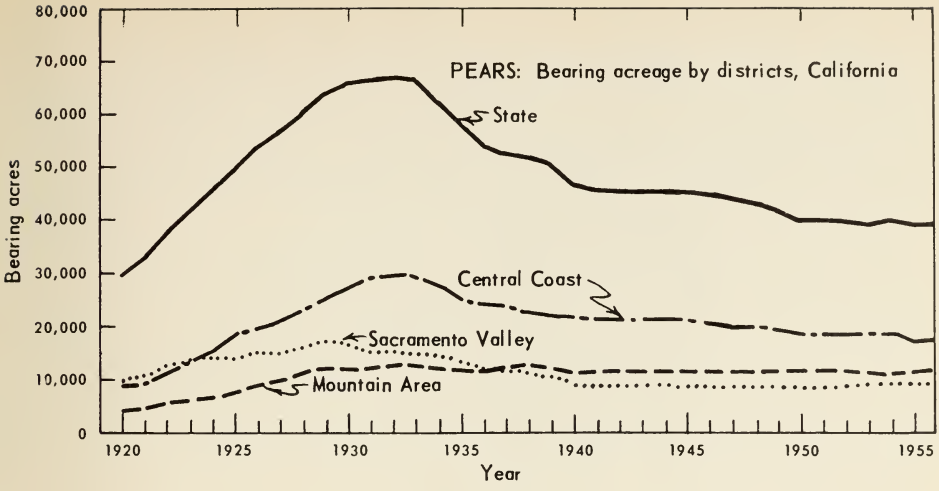
Freestone production in California declined between 1920 and 1935, as acreage declined and yields fluctuated about a constant level. Then yield increases more than offset acreage decline, and production reached an all-time peak in 1946. After the early postwar drop in acreage, freestone yields and production once again started upward.

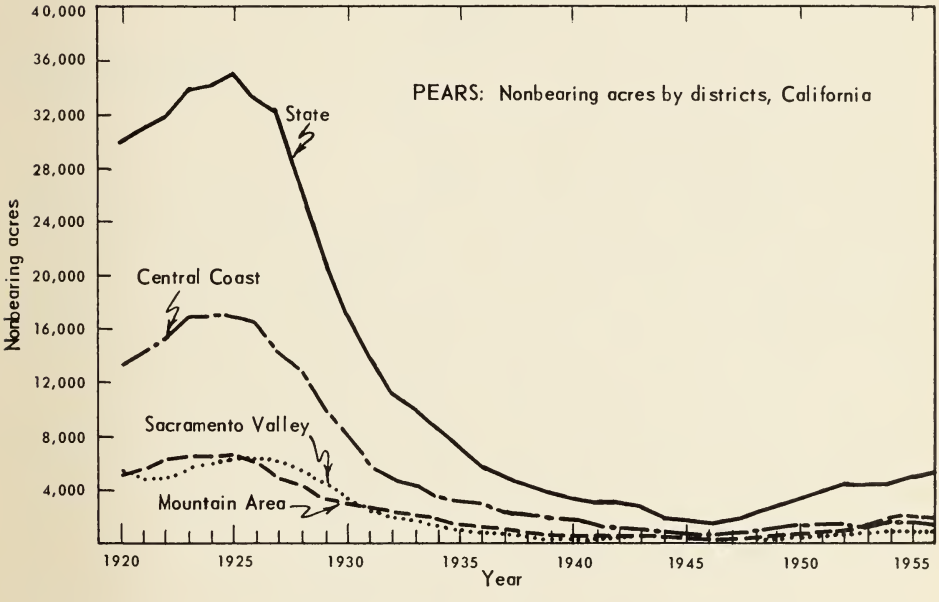
PEARS

Changes in bearing and nonbearing acreage

In the past, the Bartlett variety has dominated the California pear industry. Between 85 and 90 per cent of the state's total bearing acreage has been devoted to Bartletts, with the rest planted largely to "late" fall and winter varieties. The distance from eastern consuming centers, coupled with the perishable nature of the fruit, has channeled a growing proportion of the California crop into the canned market. Thus, prices to California growers have usually been lower than the national average.

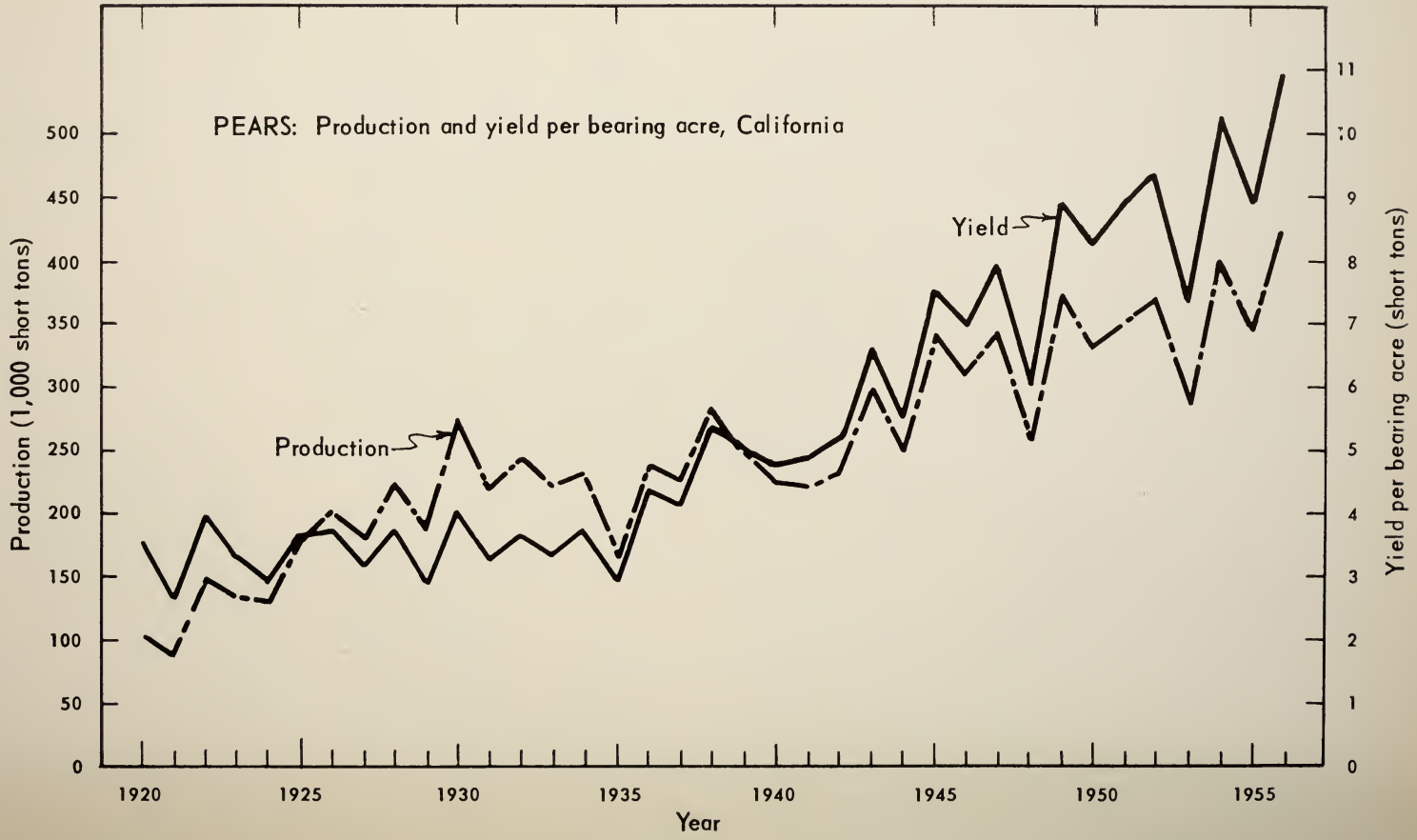
The sharp rise in bearing acreage of pears during the twenties and early thirties reflects a rapid rate of new plantings in the early twenties in response to high prices and returns during the rapid growth of the California pear industry. Overexpansion of planted acreage and production, together with depression conditions, resulted in low returns to growers during the thirties. Thus, both nonbearing and bearing acreage declined sharply until World War II. Plantings since then have increased slightly, probably in response to several years of high postwar prices to growers (in 1946, 1948, and 1951, for example). The rate of decline in bearing acreage has slackened since 1950. As a result of recent plantings, bearing acreage may stabilize or even increase slightly in the next few years.





Shifts in location of production

Changes in the Central Coast area have been the major element in both the rise and the decline of California's pear acreage. The Central Coast area comprises two major districts—San Jose and Lakeport–Kelseyville—and several less important localities, such as Sebastopol, Fairfield, Napa, and Watsonville. Most of the decline in the Central Coast in the past 25 years has been in the northern Santa Clara Valley, near San Jose. In the earlier years the decline was caused primarily by low returns; more recently, subdivision for housing and industrialization have cut into bearing acreage. Bearing acreages in the Sacramento Valley (river district north and south of Court-


PEARS: Production and yield per bearing acre, California
Production
Yield
Production (1,000 short tons)
Yield per bearing acre (short tons)
Year
0
50
100
150
200
250
300
350
400
450
500
1
2
3
4
5
6
7
8
9
10
11
1920
1925
1930
1935
1940
1945
1950
1955

land and the Yuba City district) and the mountain area (Colfax–Auburn–Loomis and Placerville districts) have remained nearly constant for the past 15 years. However, recent new plantings (particularly in the mountain area) can be expected to increase bearing acreage in the near future.

Trends in yields and production

Pear yields from 1920 to the mid-thirties remained at about a constant level, with only year-to-year fluctuations. Since the mid-thirties, however, yields per acre have trended strongly upward. Most of the yield increase can be attributed to control of fire blight and the use of preharvest sprays; new varieties have not been an important factor. Increasing maturity of existing orchards and more widespread irrigation have contributed to increased yields. Year-to-year yield fluctuations are caused by an alternate-bearing tendency and variability in weather conditions.

Yield increases over the past 20 years have more than offset the sharp acreage declines. As a result, total production has increased. Production is expected to continue upward in the next few years as acreage stabilizes or increases and yields trend upward.

PLUMS

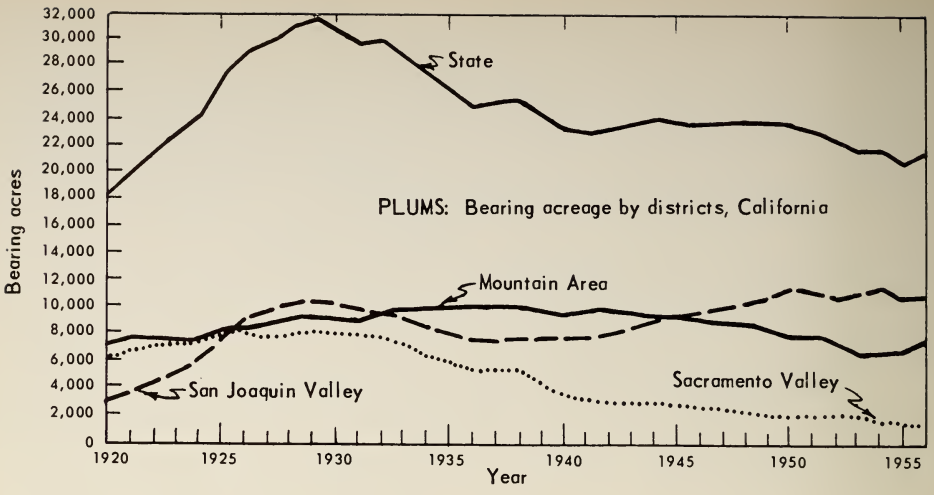
Changes in bearing and nonbearing acreage

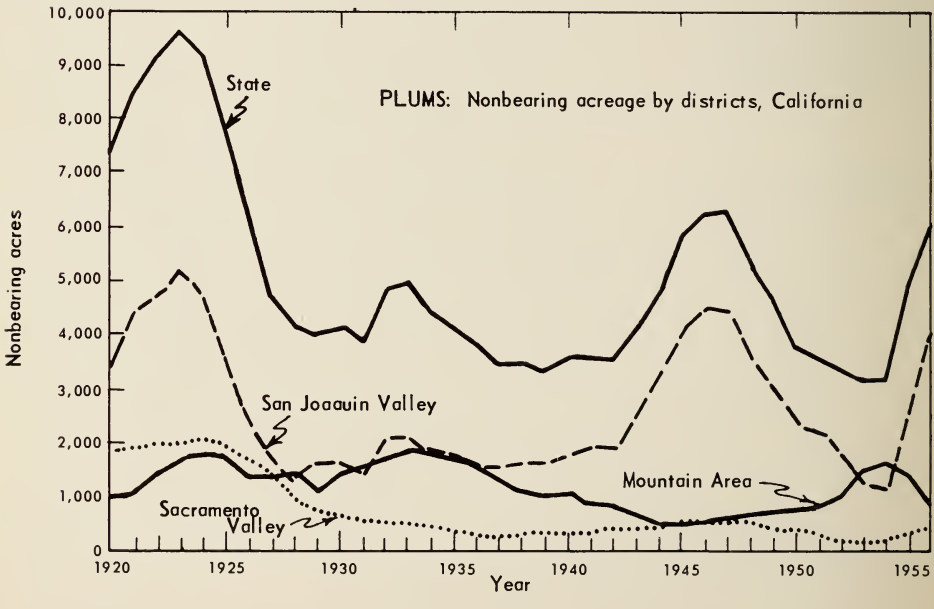
About nine tenths of commercial plum production in the United States is concentrated in a few small areas of California. Plums are a highly perishable fruit, but about 95 per cent of the crop goes to fresh consumption. A large number of widely differing varieties are marketed successively throughout the season (May to September), depending on maturity dates. Supplies of other fruits are small when the early varieties are sold, but increase substantially after June, when midseason and late plums are shipped. Recent years have seen a shift toward greater production of early varieties of plums, partly as a result of competition with other fruits in the late-season markets.

High prices received by plum growers after World War I led to an expansion of new plantings that continued into the early twenties, with bearing acreage increasing until 1929. However, lower plum prices and reduced plantings in the late twenties and early thirties led to a decline, first in nonbearing acreage and then in bearing acreage. During World War II, increased demand and higher prices again stimulated new plantings. After the war, nonbearing acreage dropped, with the result that bearing acreage began to decline slowly after 1950. Heavier rates of new plantings in 1955 and 1956, if continued, can be expected to stabilize or possibly increase bearing acreage in the near future, unless producing orchards are heavily pulled.

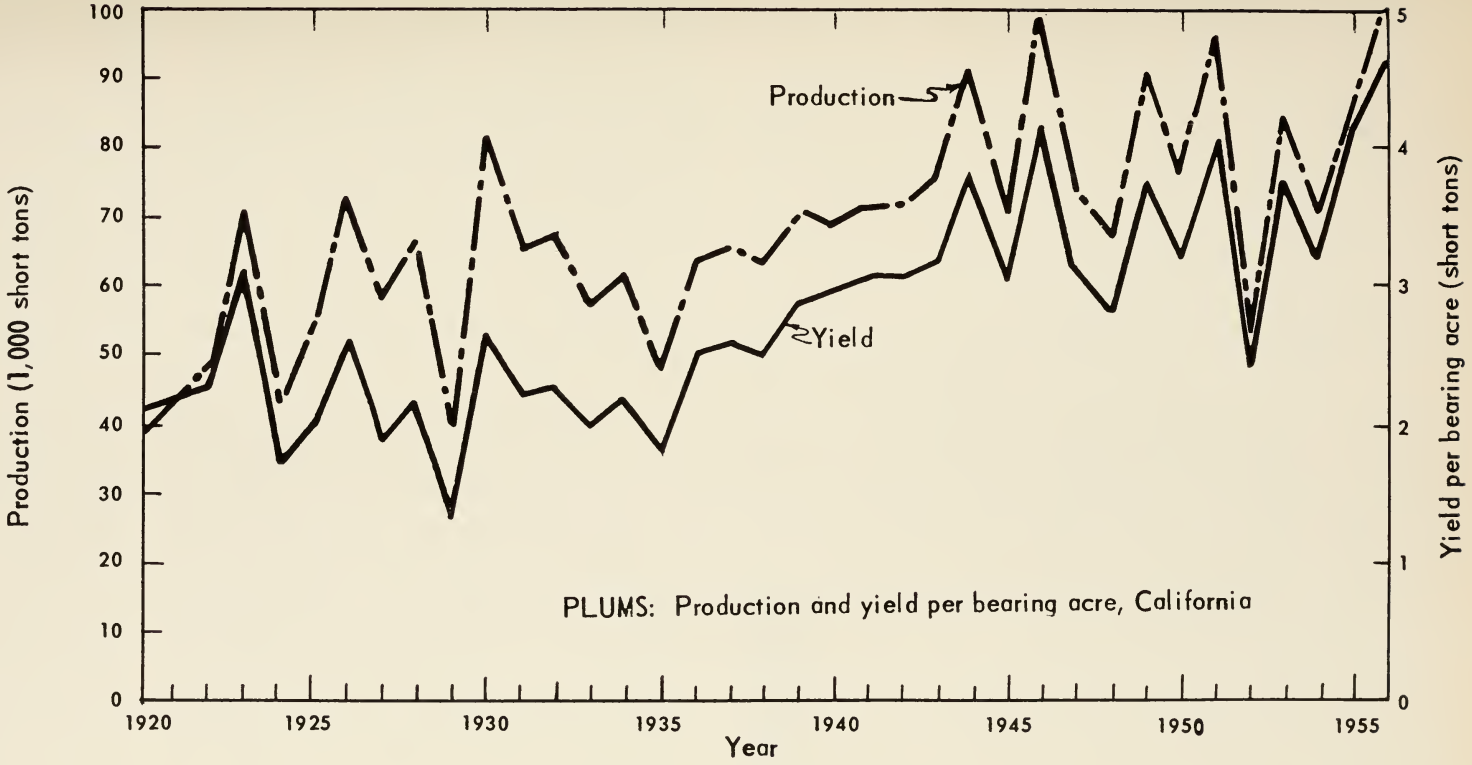
Shifts in location of production

Since the mid-thirties, bearing acreage of plums has declined in the mountain area (Loomis–Auburn area of Placer County) and in the Yuba City area in Sacramento Valley. Bearing acreage has increased in the San Joaquin Valley, particularly in the fruit belt from Clovis to Porterville. The Arvin area of Kern County and the Linden district of San





Joaquin County are also important commercial plum-producing areas in the San Joaquin Valley. San Joaquin Valley producers, besides obtaining a tonnage per acre that is greater than average, grow a larger proportion of early-maturing varieties, which on the average command more favorable prices. Even with the same varieties, the San Joaquin Valley area permits earlier ripening than the Placer area or the Sacramento Valley. The geographic shifts in production indicated above are expected to continue, as evidenced by increased new plantings in 1955 and 1956, mainly in the San Joaquin Valley. It is possible that acreage in the Placer district and the Sacramento Valley may stabilize as these areas


Production
Yield
PLUMS: Production and yield per bearing acre, California
Production (1,000 short tons)
Yield per bearing acre (short tons)
Year
100
90
80
70
60
50
40
30
20
10
0
5
4
3
2
1
0
1920
1925
1930
1935
1940
1945
1950
1955

concentrate on late varieties. Competition from the San Joaquin Valley is not expected to develop during the late season, when growers in that area become engaged in grape harvest.

Trends in yields and production

Little trend is evident in yields in 1920–35, but yields increased between 1935 and the mid-forties. For the next decade, yields fluctuated widely near a constant level. In 1955–56, yields appear to have resumed an uptrend. The primary reason for the increased yields has been the shift in location of production to the higher-yielding San Joaquin Valley. Favorable weather conditions from the mid-thirties to mid-forties helped the steady yield increases during that period. Wide annual yield fluctuations in other periods reflect variable weather conditions and the alternate-bearing tendency of plums.

Yield increases in the late thirties and early forties more than counterbalanced the decline in bearing acreage; thus, production has increased. With bearing acreage stabilizing or possibly increasing in the next few years and average yields expected to rise, increased production appears in prospect.

PRUNES

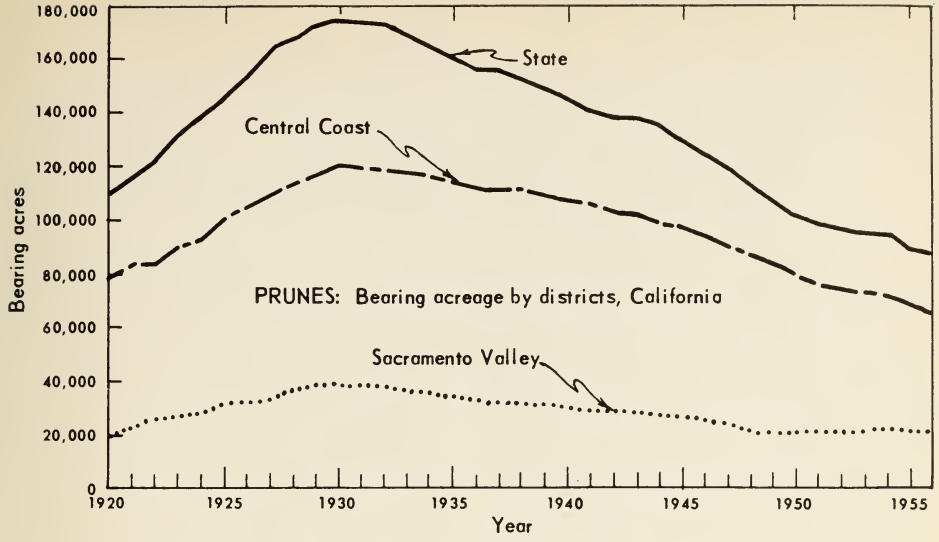
Changes in bearing and nonbearing acreage

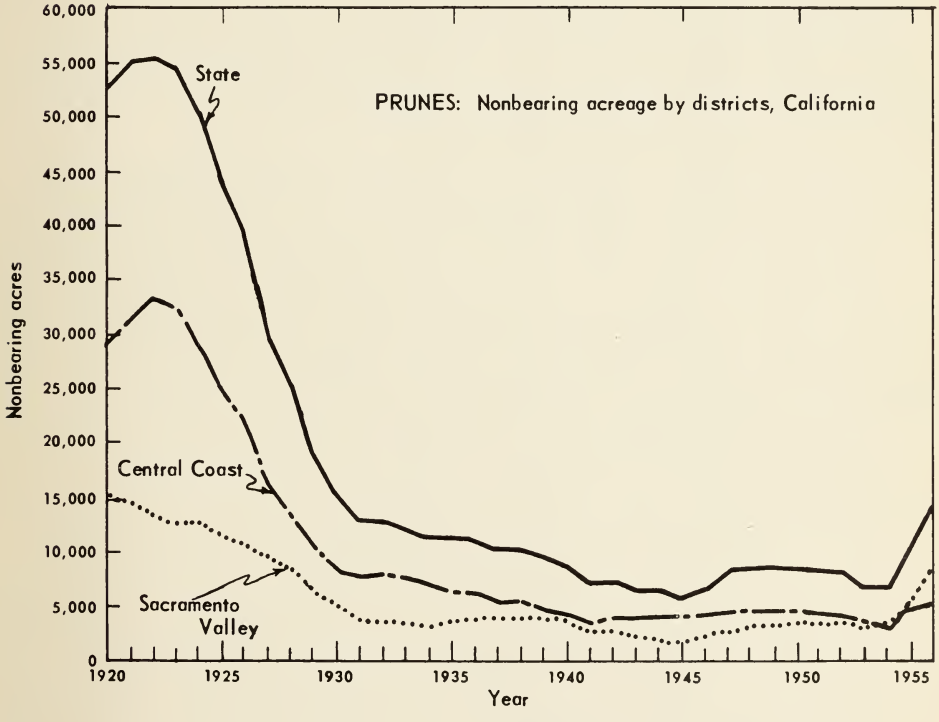
California produces nearly 90 per cent of the prunes grown in the United States, with other western states contributing the remainder. The growing habits of the tree and climatic requirements for ripening the fruit confine its production to areas where the spring and summer are warm, dry, and clear. However, winter chilling is important to normal blossoming and leaf bud emergence. The interior valleys are well suited to prune production, as are some of the coastal valleys where fog is not excessive. In southern California the winters are generally too moderate for commercial production of prunes.

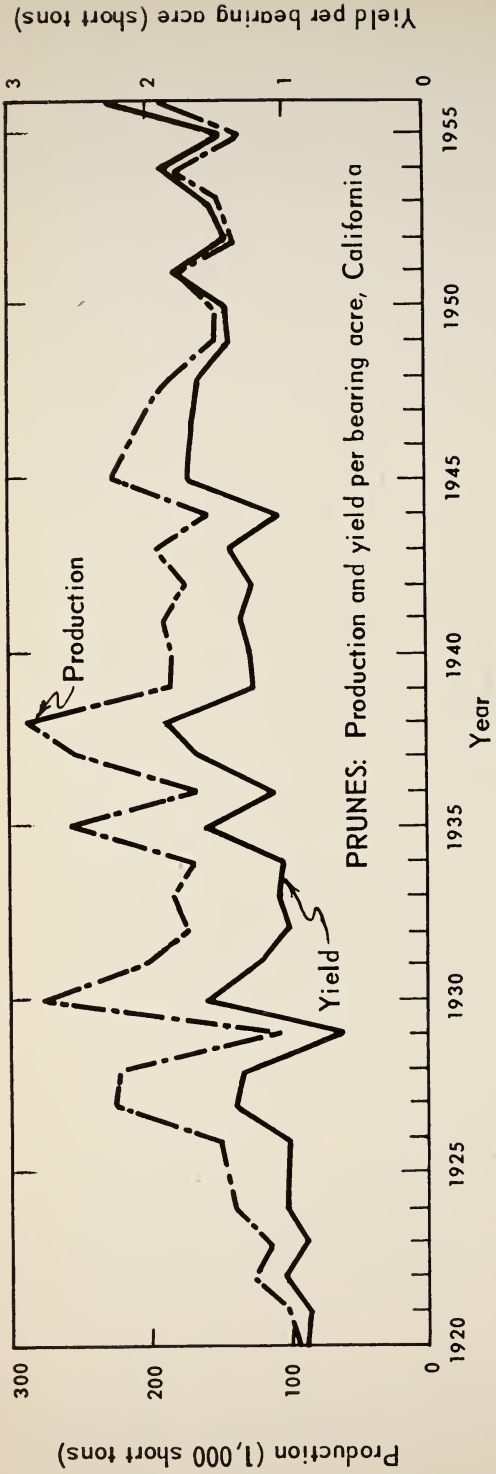
Bearing acreage in California increased over 50 per cent in 1920–30, reflecting extensive new plantings during the first half of that decade. A rapidly expanding export market for dried fruits, together with excellent grower prices, largely accounts for this increase. Nonbearing acreage dropped drastically in the latter half of the twenties, bringing about a steady decline in bearing acreage from 1930 to date. Depressed grower prices in the late twenties and thirties worked against expansion, and pullings exceeded new plantings during that period. A rise in nonbearing acreage since 1954 indicates an increase in bearing acreage during the early sixties unless the rate of pullings increases. Both the Central Coast and Sacramento Valley, the two prune-producing districts, have experienced similar changes in bearing and nonbearing acreage until recently.

Shifts in location of production

The Central Coast counties of Santa Clara (Santa Clara Valley), Sonoma (Santa Rosa–Healdsburg), and Napa (Napa–St. Helena), have accounted for about 80 per cent of the total state bear-


PRUNES: Bearing acreage by districts, California
Bearing acres
Year
State
Central Coast
Sacramento Valley
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1920
1925
1930
1935
1940
1945
1950
1955


PRUNES: Nonbearing acreage by districts, California
Nonbearing acres
Year
State
Central Coast
Sacramento Valley
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1920
1925
1930
1935
1940
1945
1950
1955



ing acreage. Since 1950, importance has shifted from the coastal counties to the Sacramento Valley, where acreage has remained almost constant while it has declined on the coast. Major plantings in the Sacramento Valley center between Gridley and Rio Oso. Plantings are extensive north of Colusa and above the Sacramento River between Orland and Chico. Scattered plantings at Fairfield, Vacaville, and Woodland account for nearly all the remaining commercial acreage in the Valley. Urbanization of the Santa Clara Valley has been chiefly responsible for this shift, though disease problems in Sonoma and Napa counties have also contributed.

New plantings in recent years in the Sacramento Valley, primarily from Marysville to Red Bluff, account for a recent upturn in nonbearing acreage. This upturn may partially reduce the rate of decline in total prune acreage caused by continued pullings in the Santa Clara Valley

Trends in yields and production

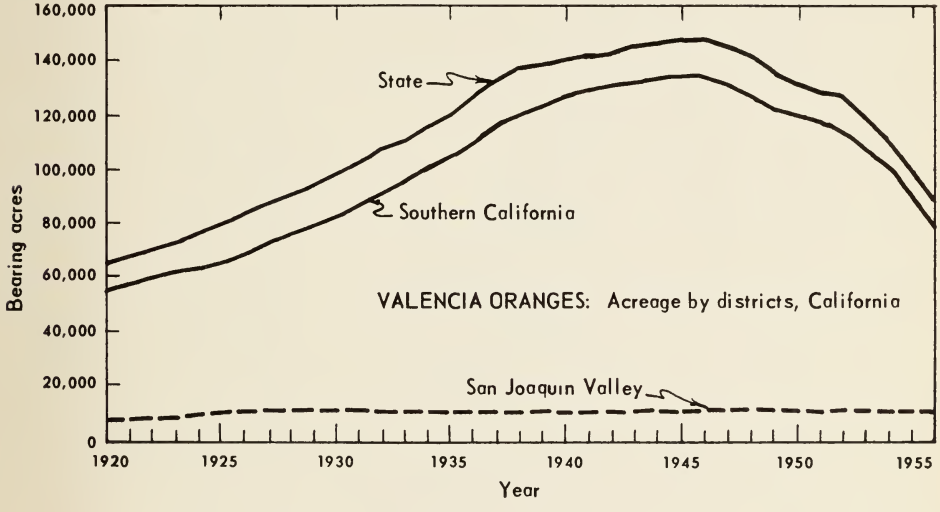
Yields of prunes have gradually increased in the past 35 years, though year-to-year fluctuations have been large. The shift in location of production can be expected to increase state average yields since yields are greater in the central valley than in the coastal counties. Because of a 10-year lag between planting date and commercial production, this shift will not be reflected in state average yields for some time unless low-producing trees are pulled at a greater rate.

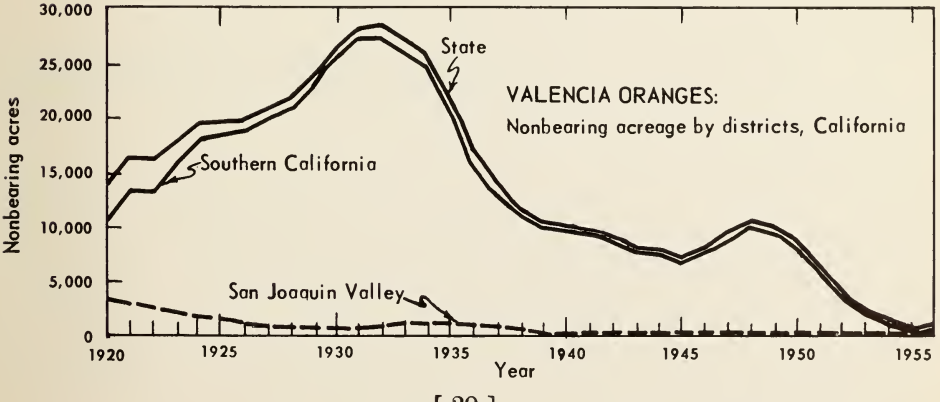
The upward trend in production in 1920–38 partly reflects yield increases as trees matured. The trend since has been slightly downward, as acreage declines more than offset yield increases. If acreage stabilizes and yields increase as expected, total production could increase slightly, though future changes in total prune acreage are difficult to predict.

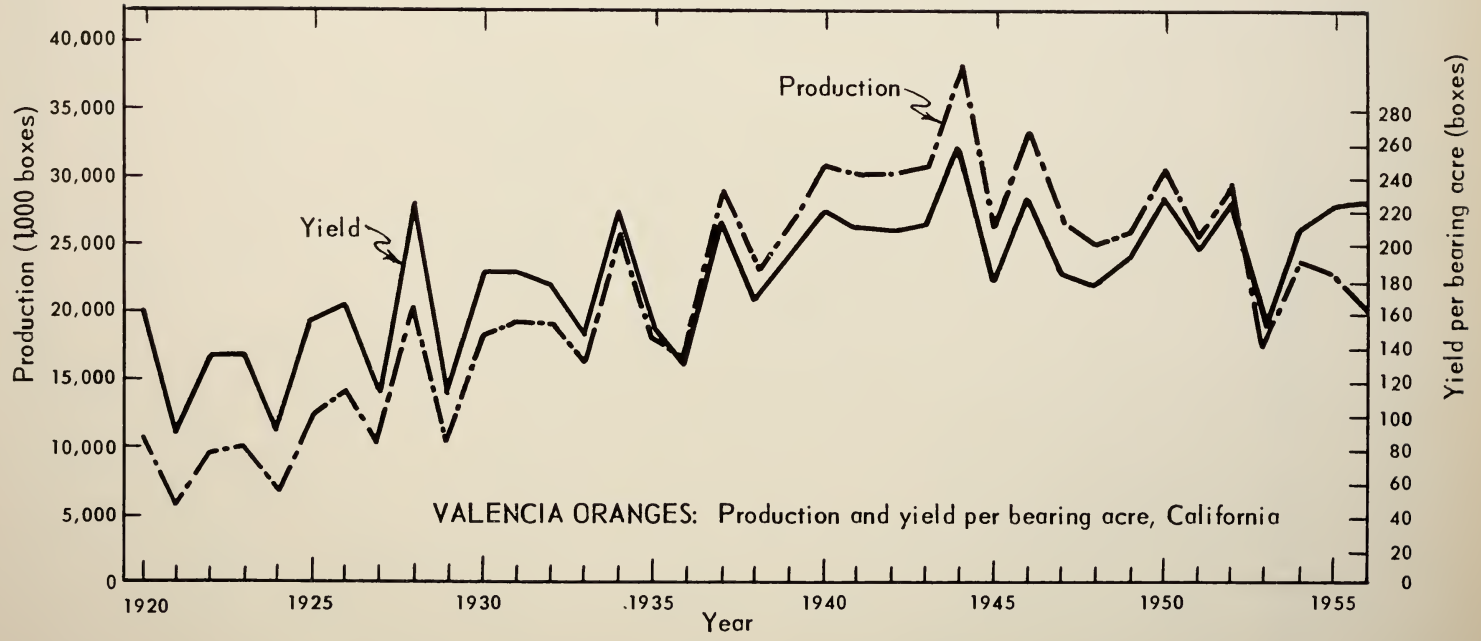
VALENCIA ORANGES

Changes in bearing and nonbearing acreage

Changes in the California orange industry are closely related to developments in orange production and marketing in other sections of the United States, particularly in Florida. Especially influenced are California Valencias, which have been shipped for fresh consumption during May–October, while fresh shipments from Florida are at a seasonal low. Therefore, California Valencia growers have generally received favorable prices and returns. New plantings during the twenties and early thirties ex-






Production (1000 boxes)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Yield per bearing acre (boxes)
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
Production
Yield
VALENCIA ORANGES: Production and yield per bearing acre, California
1920
1925
1930
1935
1940
1945
1950
1955
Year

panded bearing acreage through World War II. Since then the picture for California Valencias has changed drastically. The development of frozen orange concentrate—and the resultant boom in acreage and production of processing oranges in Florida—has reduced returns to California Valencia producers. Frozen concentrate is now widely accepted as a year-round substitute for fresh orange juice, sharply reducing the seasonal advantages of California Valencias. With demand reduced and production costs higher than in Florida, the total bearing acreage of California Valencias has dropped off sharply in the past decade. Nonbearing acreage has also declined to the lowest level on record. Thus the bearing acreage of California Valencias, at least in the near future, can be expected to decline even further.

Shifts in location of production

Nearly all of the change in bearing acreage of California Valencias can be attributed to changes in southern California. Principal districts are Ventura County, Orange County, and Corona–Arlington–Redlands. Bearing acreage in the San Joaquin Valley (mainly the Woodlake–Porterville district of Tulare County) has been constant since the early twenties. The sharp decline in state bearing acreage since 1946 can be traced directly to southern California, where many orchards have been pulled because of residential and industrial expansion. With higher-profit alternatives available for land, replantings of Valencias in southern California have not kept pace with removals.

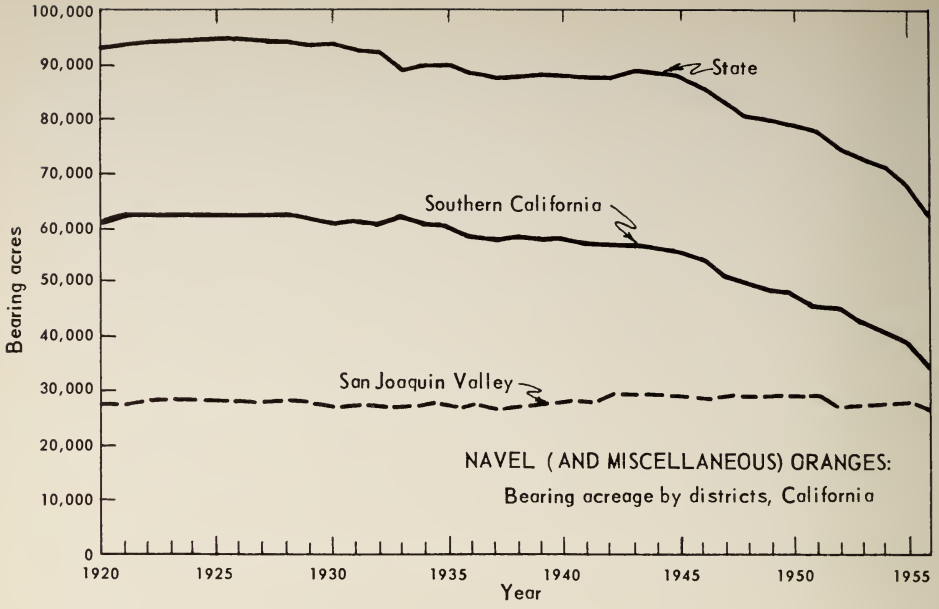
Trends in yields and production

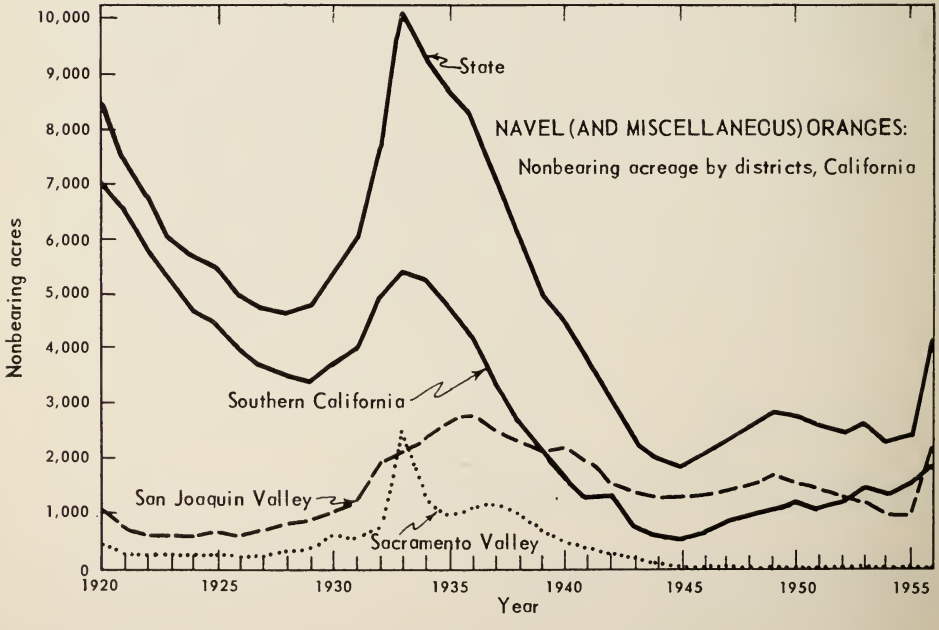
Although the yield of Valencia oranges has been highly variable, the general trend was upward until about World War II. Postwar yields have averaged near the World War II level. The increased yields mainly reflect improvements in pest and disease control, soil management, and other cultural practices, as well as the greater yielding capacity of maturing trees. Postwar yields have not increased, partly because of unfavorable weather conditions and partly because many of the orchard removals in southern California have been in the highest-yielding areas. The upward production trend until World War II reflects increases in both bearing acreage and yields. Relatively constant yields since World War II, along with reduced bearing acreage, have resulted in a downward production trend. Year-to-year fluctuations in production are caused mainly by yield fluctuations; however, the long-time production trend closely follows the trend in total bearing acreage.

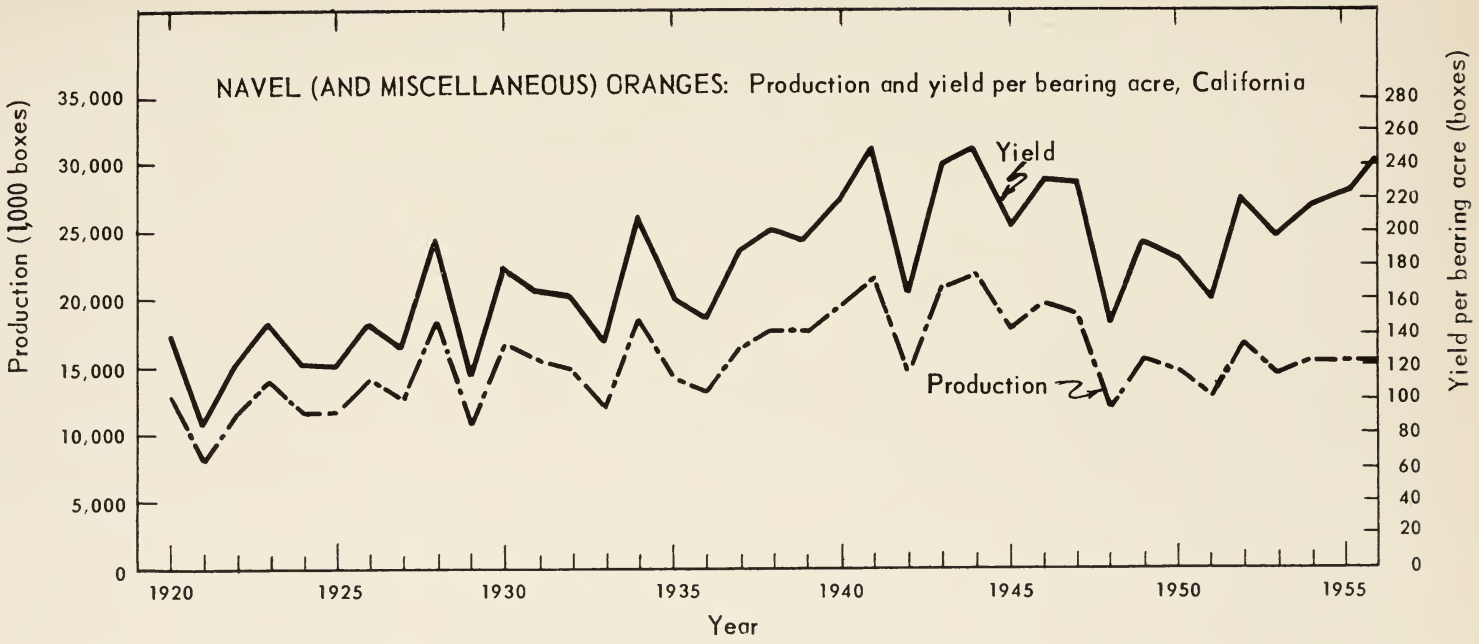
NAVEL ORANGES

Changes in bearing and nonbearing acreage

Navel oranges are a winter orange shipped mainly during the months of November through April and used primarily for fresh consumption. Hence, competition from frozen concentrates has had less impact on California navel oranges than on California Valencias. Relative returns have now shifted in favor of navels. A recent increase in nonbearing acreage of navel oranges and only a very few new Valencia plantings


100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Bearing acres
State
Southern California
San Joaquin Valley
NAVEL (AND MISCELLANEOUS) ORANGES:
Bearing acreage by districts, California
1920
1925
1930
1935
1940
1945
1950
1955
Year


10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Nonbearing acres
State
NAVEL (AND MISCELLANEOUS) ORANGES:
Nonbearing acreage by districts, California
Southern California
San Joaquin Valley
Sacramento Valley
1920
1925
1930
1935
1940
1945
1950
1955
Year


NAVEL (AND MISCELLANEOUS) ORANGES: Production and yield per bearing acre, California
Production (1,000 boxes)
Yield per bearing acre (boxes)
Year
Yield
Production
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1920
1925
1930
1935
1940
1945
1950
1955

reflect in part the changed outlook and earning positions of the two varieties. However, the season for California navels coincides with that for Florida fresh oranges. Recent increases in acreage and production of fresh winter oranges in Florida and elsewhere have depressed prices and returns to California navel producers. As a result, total bearing acreage has declined gradually, though somewhat more rapidly in recent years.

Shifts in location of production

As with Valencias, most of the decline in bearing acreage of California navel oranges has taken place in southern California, while bearing acreage in the San Joaquin Valley has remained fairly constant. Once again the acreage declines in southern California are in areas of subdivision and industrial expansion, principally in Los Angeles, Orange, and western San Bernardino counties. Orchard pullings in these areas have not been offset by new plantings. The chart indicates a recent increase in new plantings, particularly in 1956. Increased interest in plantings in the San Joaquin Valley (mainly in the favorable thermal belt in Tulare County) probably stems from two phenomena: 1) relocation by southern California producers forced out of the Los Angeles area by urbanization, and 2) a search for high-income crops to pay increasing water costs in this region of the San Joaquin Valley. In the Sacramento Valley, damaging freezes followed heavy plantings in the early thirties, preventing this area from becoming a major producing area, though isolated plantings remain. Foothill plantings in Butte and Sacramento counties are generally in thermal belts. The major acreages in Glenn County, however, receive supplementary heating.

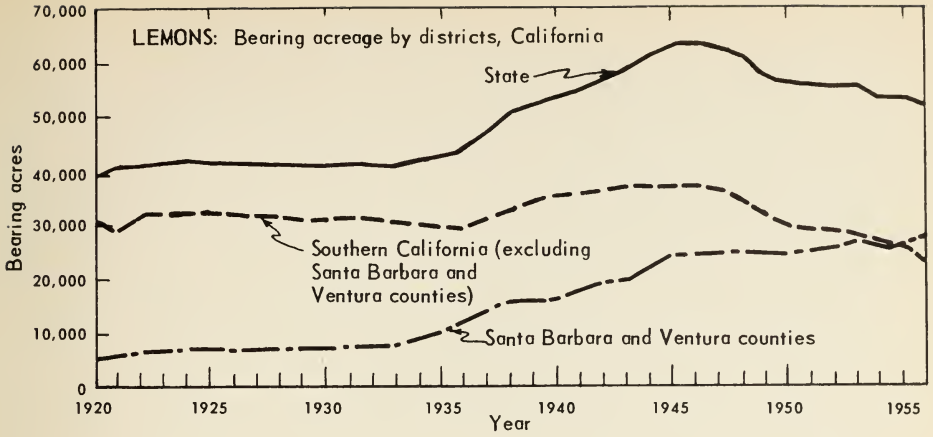
Trends in yields and production

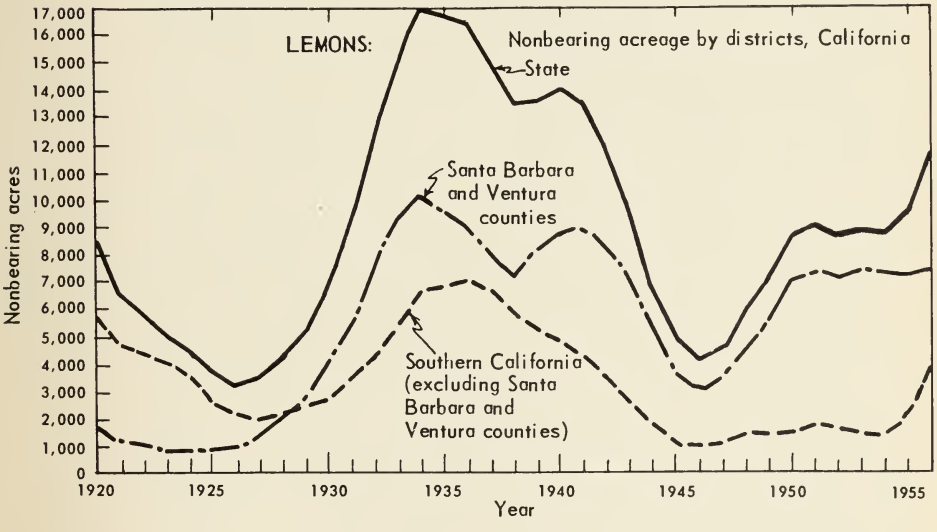
Yields of navel oranges have followed the same general trend as yields of Valencia oranges. Similarly, the uptrend from 1920 to World War II was largely caused by improved cultural practices and the maturing of orchards. A leveling-off of yields since World War II reflects increased age of orchards (many past peak production) and, possibly, less-favorable growing conditions. Invigoration treatments involving pruning and topping are often used to increase yields in older orchards. Before World War II, increases in yields more than offset the gradual acreage decline, resulting in a net increase in production. Since World War II, the interaction of a declining acreage with a relatively constant level of yields has caused a production downturn.

LEMONS

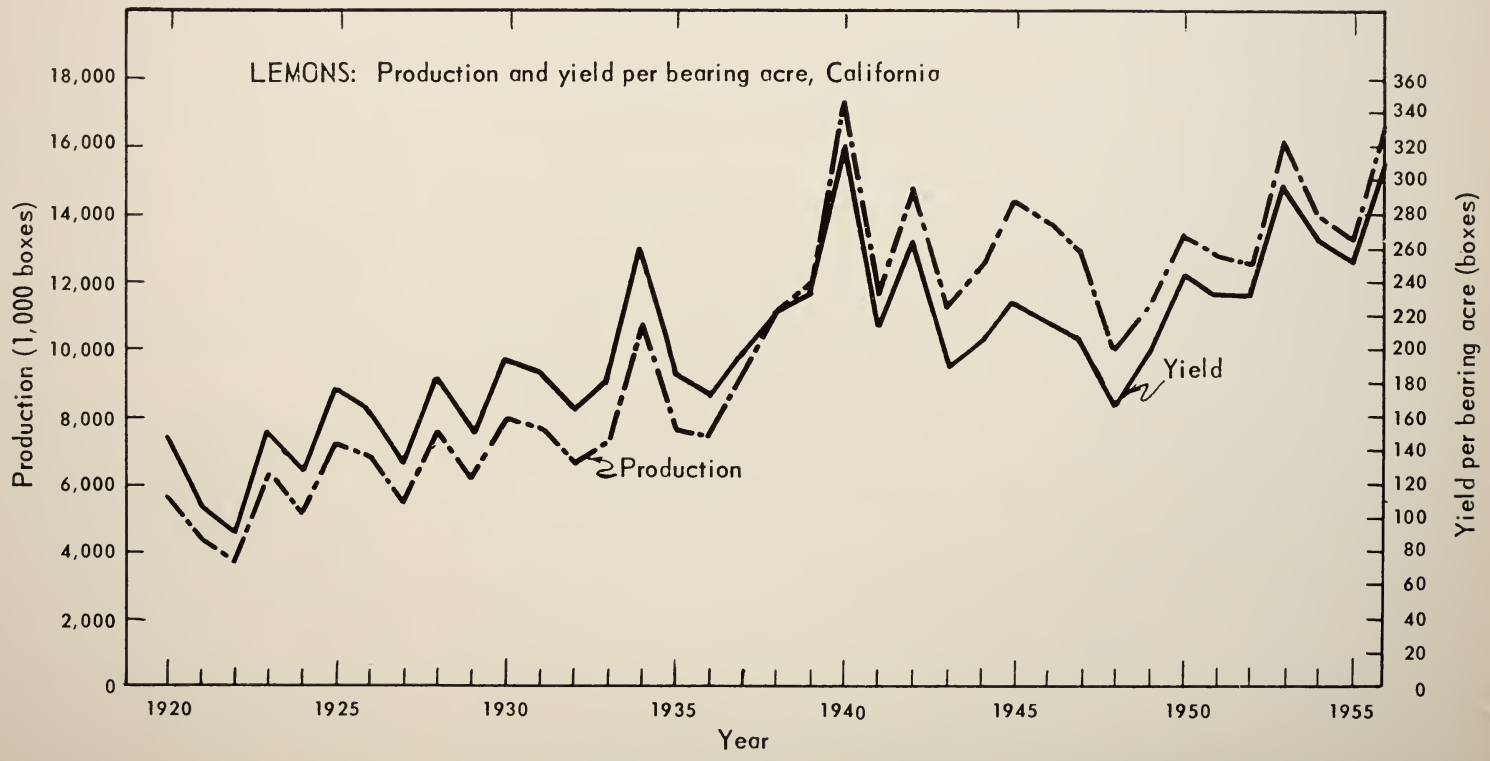
Changes in bearing and nonbearing acreage

Practically all of the United States lemon crop was produced in California until recent years. The crop was marketed primarily in fresh form. Since about 1950, the volume of processed lemon products has increased sharply, primarily because of the development of frozen lemonade and its rapid acceptance by consumers. Consequently, certain domestic areas (mainly Florida and Arizona) and foreign areas (mainly Italy) that formerly were unable to compete with California's high-quality lemons in the fresh market are now able to compete in the expanded processed market.





Past trends in bearing acreage are closely associated with nonbearing acreages, with proper allowance for plantings to reach bearing age. Bearing acreage remained constant in 1920–34. However, increased plantings following the relatively high-income years of the twenties led to greater bearing acreage in the mid-thirties, reaching a peak at the close of World War II. During World War II, the availability of many profitable alternative crops reduced new lemon plantings so that the postwar bearing acreage has fallen off slightly. A sharp drop in reported bearing acreage in 1949 arose from a change in reporting methods rather than an actual acreage change; thus, while the data after 1948 are consistent, they are not entirely comparable with earlier data. Better returns in recent years for fresh lemons, and particularly for processed lemons, have encouraged new plantings. Thus, it seems reasonable to assume that the bearing acreage of California lemons will stabilize or rise slightly in the next few years.


LEMONS: Production and yield per bearing acre, California
Production (1,000 boxes)
Yield per bearing acre (boxes)
Year
Production
Yield
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1920
1925
1930
1935
1940
1945
1950
1955

Shifts in location of production

The location of lemon acreage within California has shifted. Only certain localized areas, all in southern California, are well suited to commercial lemon growing. The coastal plains of Ventura and Santa Barbara counties have become relatively more important producers, while aggregate acreage elsewhere in southern California has declined. Main reasons for the shift apparently are: 1) relocation forced by urbanization, and 2) relatively higher yields in Ventura and Santa Barbara counties. Recent plantings in the Coachella and other desert valley districts also have added to nonbearing acreage.

Trends in yields and production

Lemon yields demonstrated a strong upward trend in 1920–40. The peak yields in 1940 resulted from an acreage shift to higher-yielding Santa Barbara and Ventura counties, improved care of trees, and, possibly, very favorable weather conditions. Increasing yields during the prewar period were due in part to improved orchard management and production practices, particularly pest and disease control, better protection against adverse climate, and improved soil management and fruit handling methods. Yields in 1940–50 were somewhat lower because of less-favorable weather. Damaging freezes in 1948 and 1949 depressed yields in those years. Since 1950, yields have again resumed an upswing. In postwar years the number of trees per acre has been increased and an improved strain of disease-free lemon has been adopted. Both of these factors will probably contribute to further increases in yield per acre.

Production trends are a direct result of the bearing acreage and yield trends discussed above. Production rose during 1920–40, primarily from increasing yields but also from some increase in acreage. Declining yields during the forties were nearly offset by the rise in bearing acreage. Since 1950, yield increases have more than offset acreage declines, thereby increasing production. Year-to-year production changes are highly and positively correlated with yield changes.

ALMONDS

Changes in bearing and nonbearing acreage

Almond production in the United States is concentrated in California, which has about 98 per cent of the total acreage. U. S. imports of almonds (mainly from Spain and Italy) have decreased in relative and absolute tonnage as the domestic industry has expanded.

Changes in the nonbearing and bearing acreages of almonds are not easily explained by past general economic conditions. In fact, trends in nonbearing acreage run counter to conditions in the national economy. Nonbearing acreage declined in the twenties, though prices in general were favorable. Plantings and nonbearing acreage increased substantially during the depression. Nonbearing acreage declined again during World War II, despite generally high prices. This unusual relationship may be partly explained by observing that almond prices relative to prices of other agricultural commodities are probably more significant than the absolute level of almond prices in determining new plantings. Another explanation may be in the nature of the crop, which is relatively easy to grow and prospers under somewhat adverse soil and other conditions. Thus, during periods of falling prices, growers apparently shifted from higher-risk crops to almonds. During periods of higher prices, growers apparently shifted away from almonds toward walnuts and other crops. Changes in bearing acreage logically follow changes in nonbearing acreage, allowing nearly ten years for a newly planted crop to come into significant bearing.

Shifts in location of production

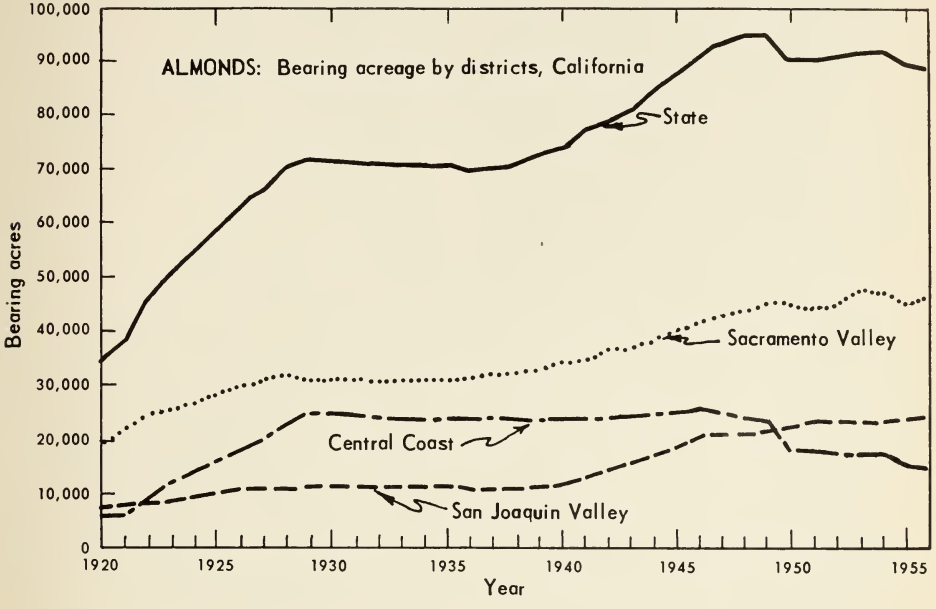
The bearing acreage of almonds in the Central Coast (mainly the Brentwood district of Contra Costa County and the Paso Robles district of San Luis Obispo County) has declined in recent years. At the same time, bearing acreages have steadily increased in the Sacramento Valley (largely in Butte, Yolo, Colusa, and Sutter counties) and in the northern San Joaquin Valley (mainly in Stanislaus, Merced, and San Joaquin counties). The shift, which can be explained by higher yields in the interior, is far from complete, as clearly shown by a steady decline in nonbearing acreage in the Central Coast area. Favorable grower prices in 1955–56 have encouraged new plantings in the Central Valley. Much of the new acreage is being planted on relatively less-productive soils near the peach-growing areas.

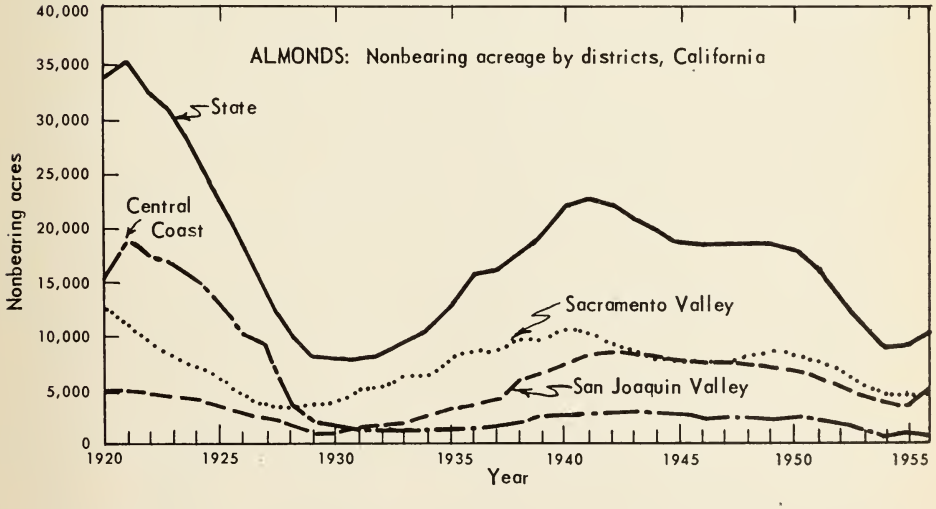
Trends in yields and production

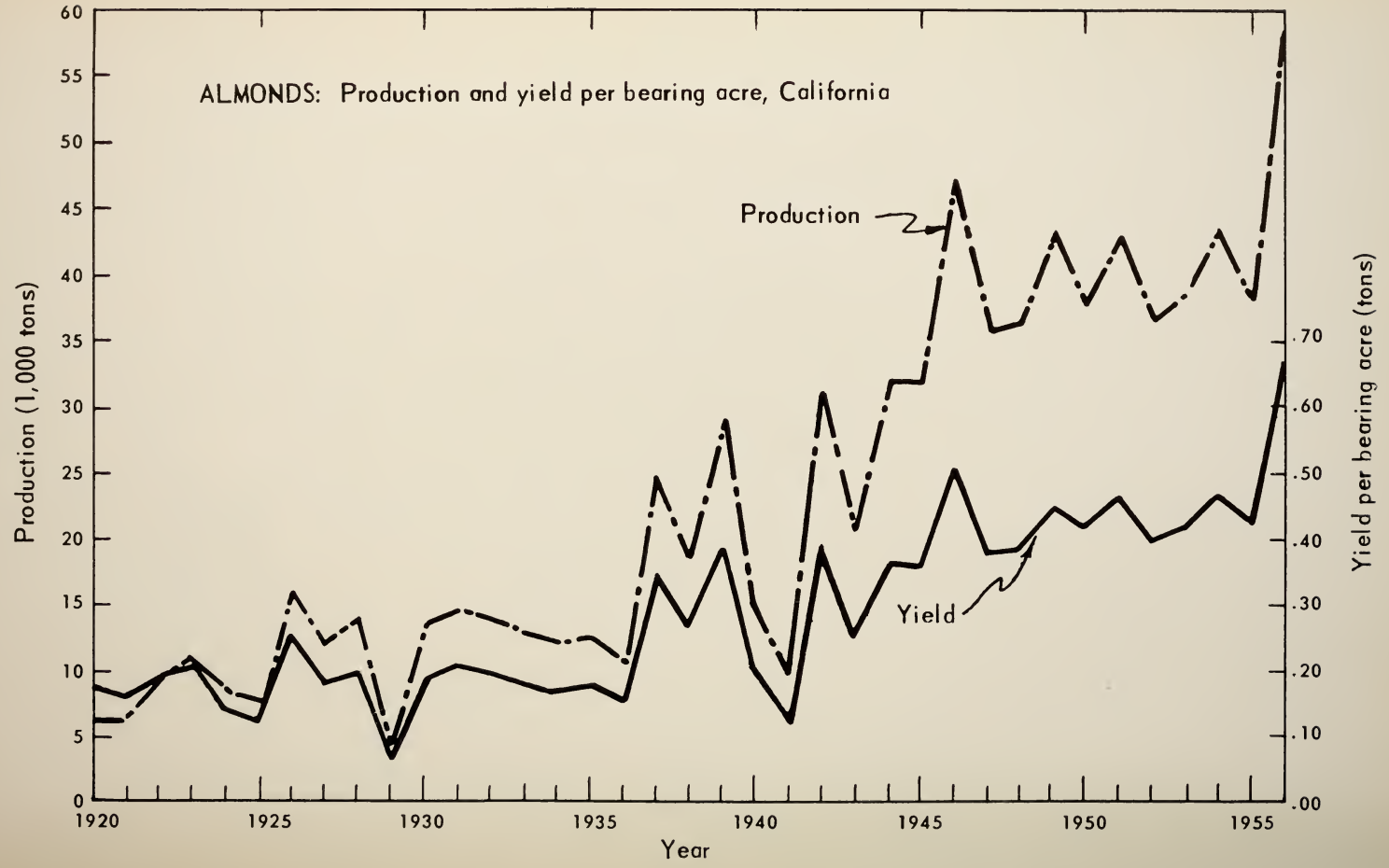
Yields of almonds in California have increased since the late thirties, reaching a record peak in 1956. The increase resulted from a combination of several factors: 1) better cultural practices, including more and better fertilizers and pesticides, better pruning, increased protection against frost, better spacing of trees and other practices; 2) favorable climate in almond-growing areas; and 3) a shift of acreage to the interior Sacramento and San Joaquin valleys, where

better soils and irrigation and improved varieties provide opportunities for higher yields. The outlook is for further yield increases as older, low-producing coastal orchards are replaced by higher-yielding orchards in the Central Valley.

As a result of yield and acreage increases, total almond production in California has increased fivefold since the twenties. With bearing acreage likely to remain near the current level and with yields increasing, prospects are for a continuation of the uptrend in total production.






ALMONDS: Production and yield per bearing acre, California
Production
Yield
Production (1,000 tons)
Yield per bearing acre (tons)
Year
60
55
50
45
40
35
30
25
20
15
10
5
0
.70
.60
.50
.40
.30
.20
.10
.00
1920
1925
1930
1935
1940
1945
1950
1955

WALNUTS

Changes in bearing and nonbearing acreage

In terms of tonnage, walnuts are the main tree-nut crop grown in the United States, followed closely by pecans and more distantly by almonds and filberts (hazelnuts). Commercial walnut production in this country is confined to the Pacific Coast (California, Oregon, and Washington), with California dominating—about 80 per cent of U. S. acreage and 90 per cent of U. S. production. Concentration of production allows the industry to be highly organized; about 85 per cent of California's production is processed and marketed by the Diamond Walnut Growers, Inc., a grower-owned cooperative marketing association.

As with most tree crops, the annual supply of walnuts is little affected by current economic forces, though they influence new plantings, affecting supplies later. Thus, a steady expansion in bearing acreage through the thirties reflects a high rate of new plantings in the twenties, when prices were favorable. Depression prices during the thirties discouraged new plantings. The resulting decrease in nonbearing acreage was halted only after another high price period, during World War II. Total bearing acreage has declined somewhat since 1940, mainly because of a rapid rate of removals in southern California.

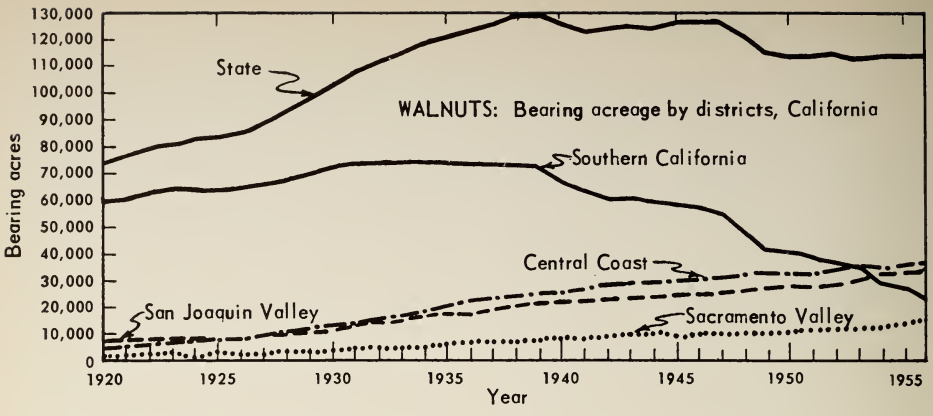
Shifts in location of production

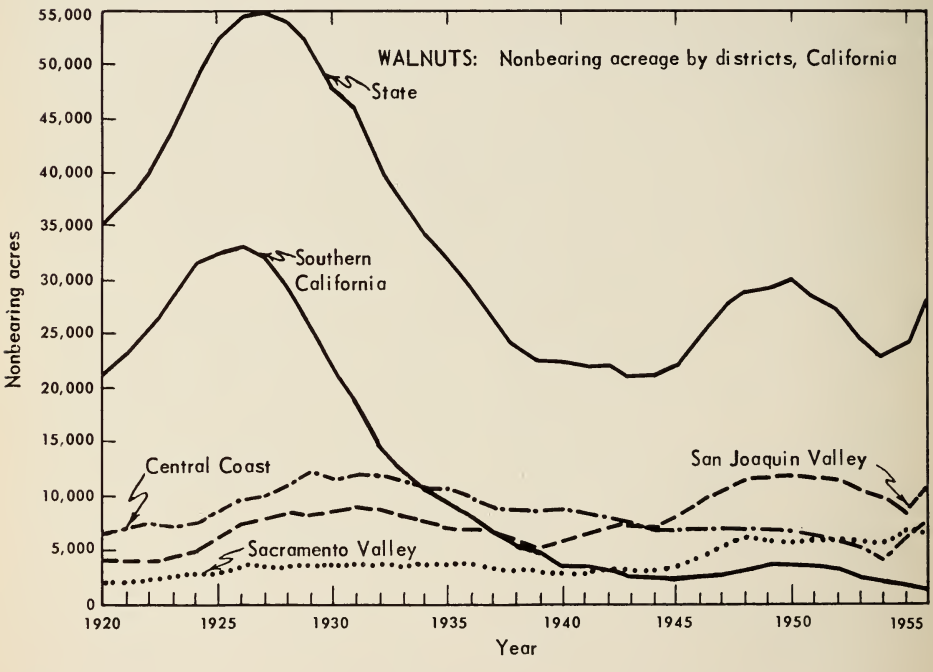
The decline of bearing acreage in southern California has been striking. This acreage is in three principal districts: Pomona, Ventura–Santa Paula–Moorpark, and Santa Barbara–Goleta. Acreages have increased substantially in the Central Coast (Santa Clara Valley, central Contra Costa County, and Lake County), the San Joaquin Valley (Linden, Modesto, and Visalia), and the Sacramento Valley (Yuba City–Marysville, Colusa, Chico, and Corning areas). The rapid rate of tree removals in southern California has resulted from suburban development, high production costs, competition from more-profitable alternative crops, and pest infestations. The shift to northern areas, also encouraged by potential yield differentials, is expected to continue. Increased new plantings in northern California indicate that bearing acreage in these areas will continue to rise in the next few years, probably offsetting the decline in southern California.

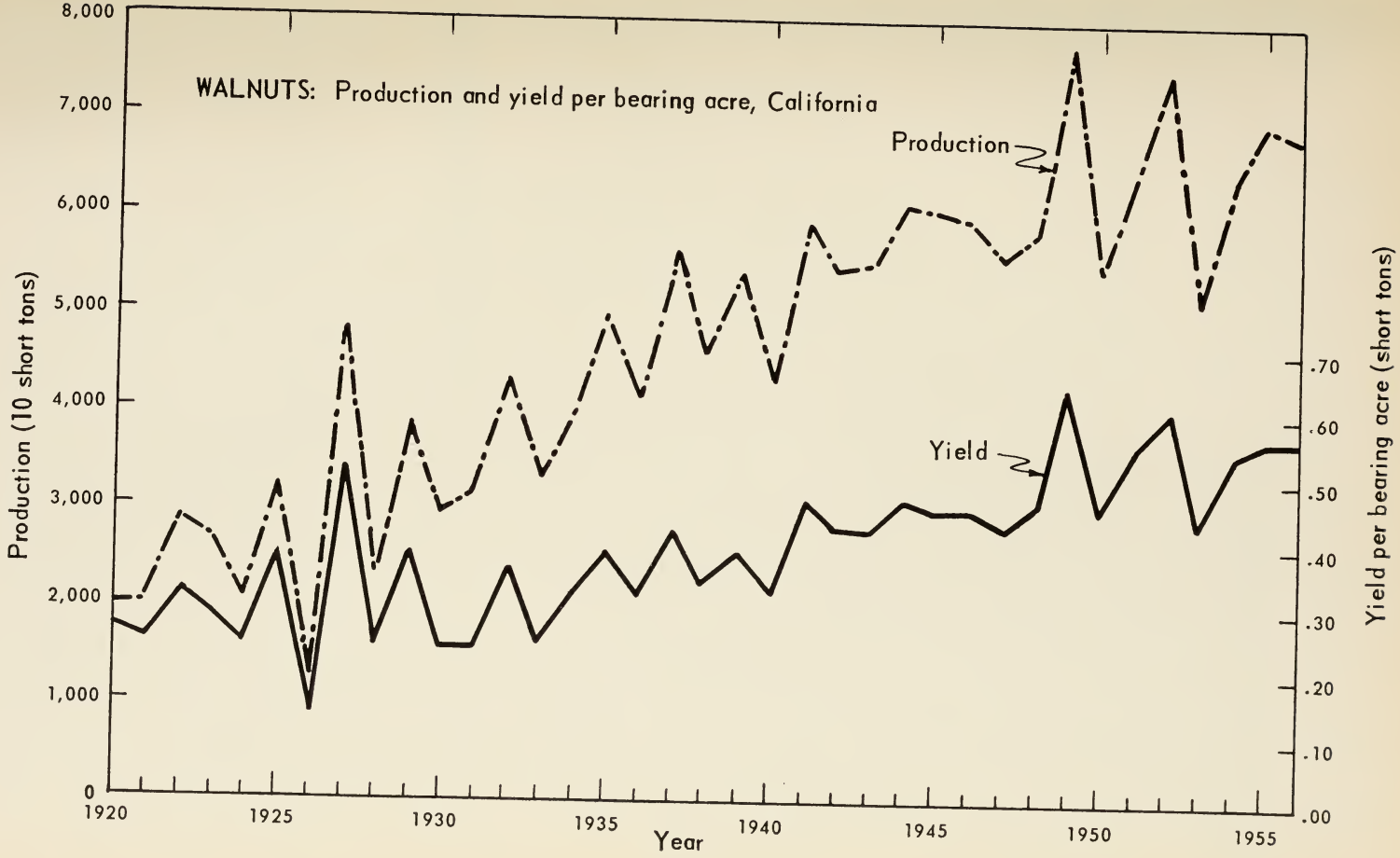
Trends in yields and production

Yields of walnuts have been quite irregular from year to year, but follow a general upward trend since the late thirties. Age of walnut groves is an important factor in yields, since the productive capacity of walnut trees increases greatly with size. Therefore, yields per acre will probably increase at a faster rate in the near future as recent plantings in northern California mature.

Total production of walnuts in California increased sharply until World War II, with both acreage and yield increasing. Since then, increased yields have about offset acreage declines. Substantial annual fluctuations reflect yield variations. Production in the future is expected to rise as yields continue upward and bearing acreage stabilizes.


WALNUTS: Bearing acreage by districts, California
Bearing acres
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
State
Southern California
Central Coast
San Joaquin Valley
Sacramento Valley
1920
1925
1930
1935
1940
1945
1950
1955
Year

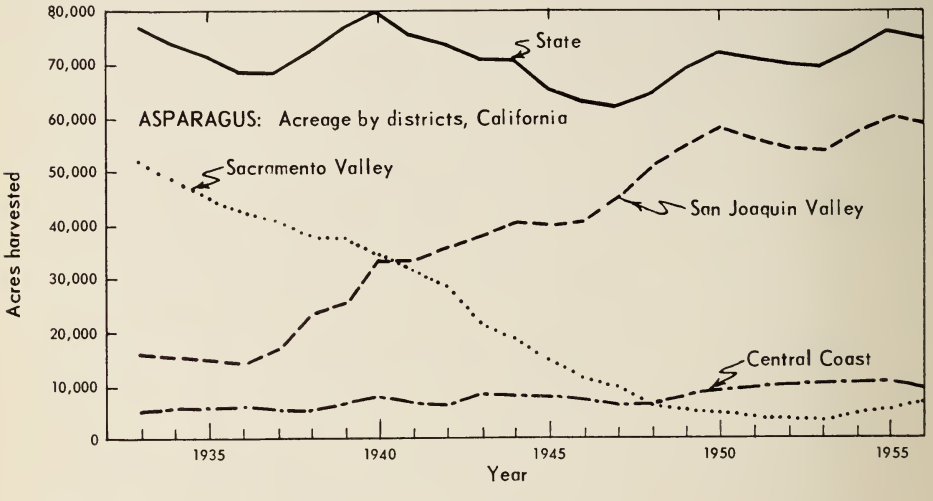

WALNUTS: Nonbearing acreage by districts, California
Nonbearing acres
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
State
Southern California
Central Coast
San Joaquin Valley
Sacramento Valley
1920
1925
1930
1935
1940
1945
1950
1955
Year

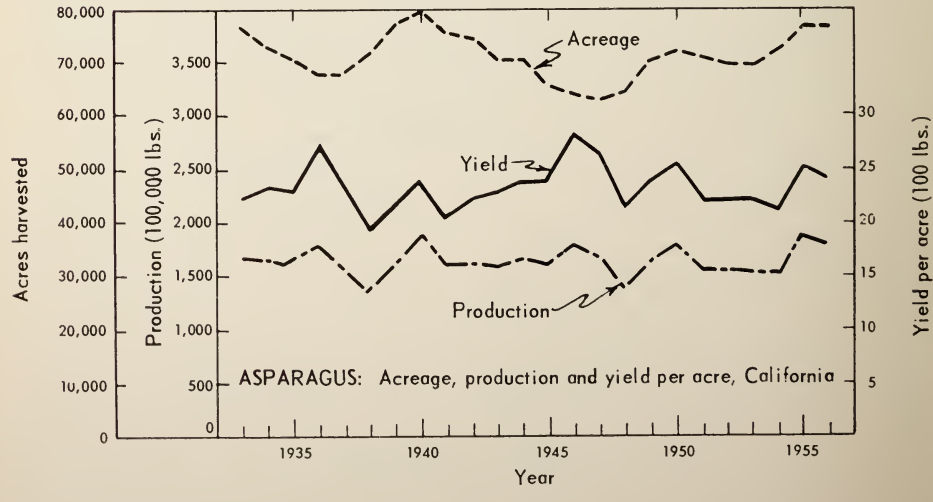

WALNUTS: Production and yield per bearing acre, California
Production
Yield
Production (10 short tons)
Yield per bearing acre (short tons)
Year
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
.70
.60
.50
.40
.30
.20
.10
.00
1920
1925
1930
1935
1940
1945
1950
1955

ASPARAGUS

Changes in acreage

California is by far the largest single asparagus-producing state, with about half of U. S. harvested acreage. In both California and the nation, asparagus production has been relatively stable since before World War II, excepting annual fluctuations. However, an increasing portion of U. S. production has gone to processing, largely because of increased





output of frozen asparagus. California, as a major producer of relatively high-priced, high-quality asparagus, has experienced a lesser shift from fresh to processing uses. Harvested acreage in California since 1933 has fluctuated within a rather narrow range (63,000 to 80,000 acres).

Shifts in location of production

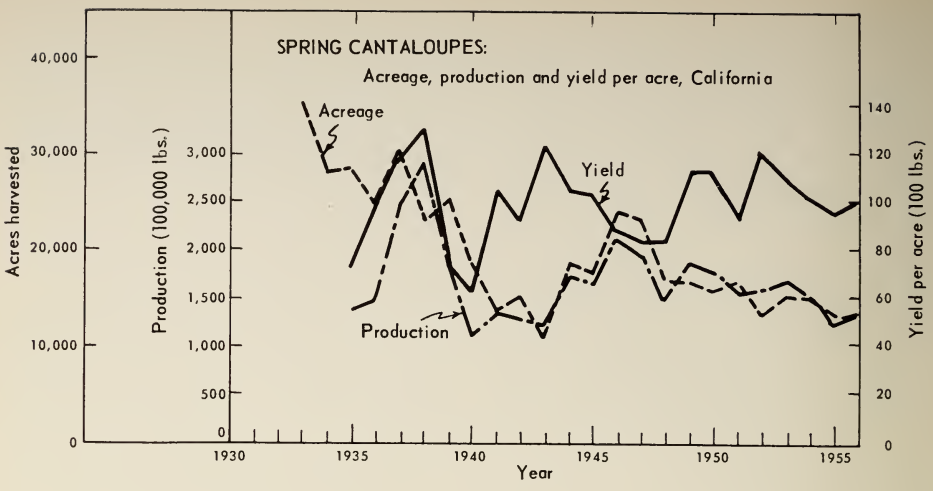
A shift from the Sacramento to the San Joaquin Valley since 1933 has been striking. The major reason has been Fusarium wilt in asparagus-producing areas of the Sacramento Valley. Asparagus cannot be profitably replanted on afflicted lands even after many years. Hence, asparagus acreage has moved south to "clean" soils in the Delta area. Acreage in the Central Coast area has increased slightly over the years. Recent greater plantings in the Salinas Valley may continue this uptrend. Recent plantings in Coachella and Imperial valleys have not yet come into production. When they do, a long-time downtrend in southern California may be reversed. Production costs are extremely high in southern California, yet premium prices on the early fresh market may encourage future production. Asparagus acreage may well shift considerably in the future as the search continues for new disease-free soils well suited to asparagus production.

Trends in yields and production

In contrast to most California crops, asparagus shows no general upward trend in yields since 1933. The geographic shifts are responsible. The move to lower-producing soils in the Delta has been roughly offset by improved cultural practices. The peat soils of the Delta area provide lower yields than were obtained on the peat sediment soils of former asparagus-producing centers; asparagus beds were also longer-lived on the sediment soils. High water tables and slow subsidence in the Delta area are additional problems hampering production. Relatively stable acreage and yields have resulted in remarkably stable asparagus production over the years.

CANTALOUPS

Harvest of cantaloups in California starts about mid-May in the Imperial Valley, gradually moves north into the San Joaquin Valley, and ends in October in the Sacramento Valley. For reporting purposes, cantaloup production in California is divided into two classes: 1) *spring*, harvested from about May 1 to July 10; and 2) *midsummer*, harvested from about July 1 to October 10. In the thirties the desert valleys of Imperial and Riverside counties accounted for practically the entire *spring* production in the United States. Since the thirties California has lost part of the *spring* market, first to the Yuma (Arizona) district and later to Texas. In the last 3 or 4 years the combined acreages of Arizona and Texas have equaled or exceeded California acreage. However, the acreage of *midsummer* cantaloups in California (primarily from the San Joaquin Valley) has increased—from about one fifth of the U. S. total acreage in 1939–40 to about one half in recent years.



Spring cantaloups

A combination of factors has accounted for the decline of spring cantaloup acreage in California. Diseases, primarily cantaloup mosaic and crown blight, have harmed the yields and quality of cantaloups in the Imperial Valley. The result has been a shift to areas both within and outside California. Until 1940, almost the entire California spring cantaloup crop was produced in Imperial Valley. By 1956, Riverside County (mainly the Blythe area) grew almost as many acres of spring cantaloups as did Imperial County. In addition, production has shifted out of the state to the Yuma district and to Texas and Mexico. Buyers prefer the Arizona cantaloups, and producers there have averaged slightly better yields than producers in California. Texas and Mexico provide increased competition in the "early" market—Mexico in April and Texas in May. Lower transport costs to midwestern and eastern markets have proved advantageous to Texas, even though yields have averaged considerably lower than in the California–Arizona area.

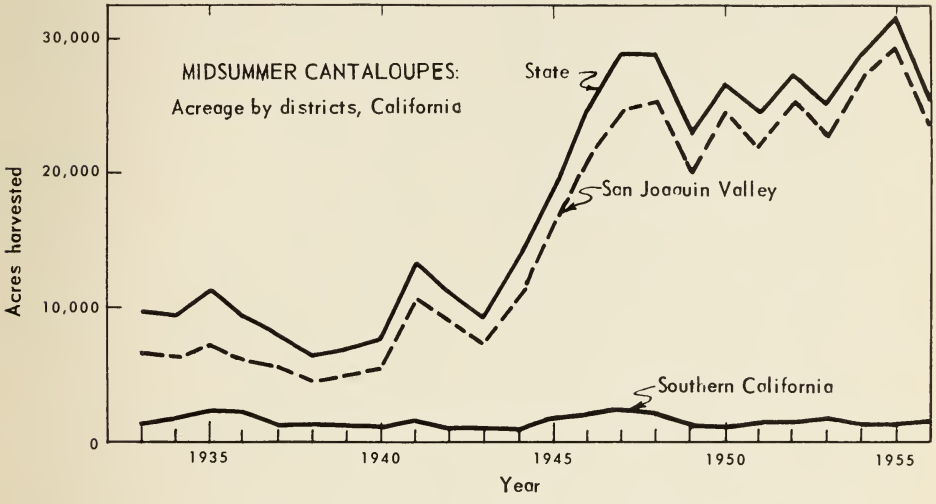
Spring cantaloup yields in California have been highly variable. In addition, the level of yields has not increased since the thirties. As mentioned above, disease is the major reason. Because the general level of yields has not changed, total production closely follows trends in acreage.

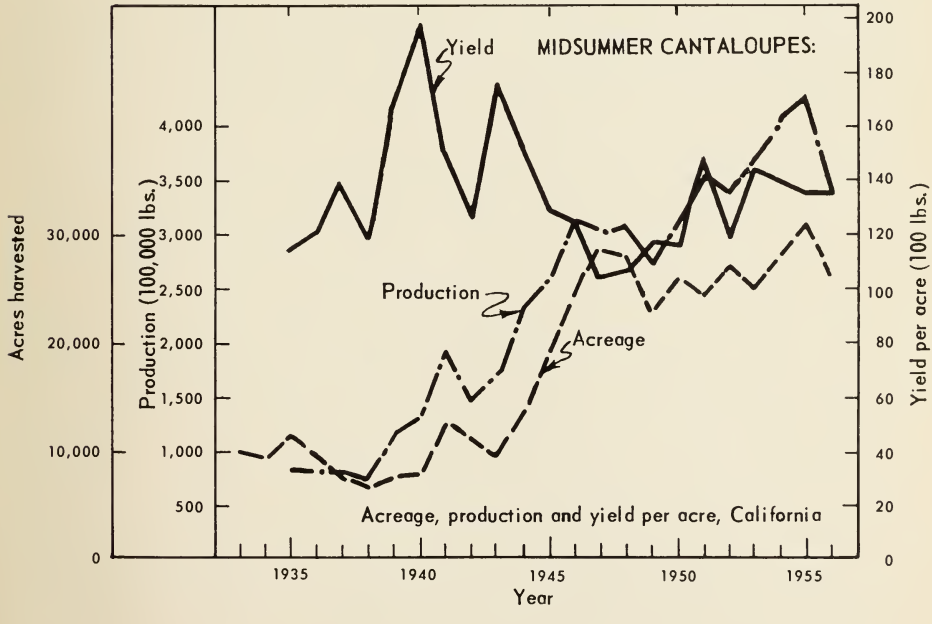
Midsummer cantaloups

The midsummer cantaloup shipping season in the Central Valley begins about mid-June, in the Delano–Bakersfield district of Kern County, followed by the "Westside" section of the Huron, Coalinga, Lemoore, San Joaquin, Firebaugh, Mendota, Dos Palos, and Los Banos districts. The Tracy–Vernalis–Patterson–Newman–Crows Landing and Turlock–Modesto areas follow a peak in August and September. Late-season harvest in selected areas of the Sacramento Valley is completed by mid-October.

Growth in acreage and production of midsummer cantaloups in the San Joaquin Valley followed the decline of spring cantaloups in southern California. Many growers moved north from the Imperial Valley into various areas of the Central Valley. Thus, most of the World War II and postwar expansion in acreage was in the San Joaquin Valley. Southern California, which markets slightly earlier than the Central Valley, has maintained a relatively constant midsummer acre-

age. Fluctuations in acreage since about 1948 partly reflect grower response to prices of the preceding year. Yields in recent years have fluctuated less widely than in the late thirties and early forties. This stabilization can be partially attributed to the relative shift in acreage to the San Joaquin Valley from southern California, where early yields are highly variable. The development of mildew-resistant varieties has also served to stabilize yields. Total production of midsummer cantaloups closely follows general acreage trends.



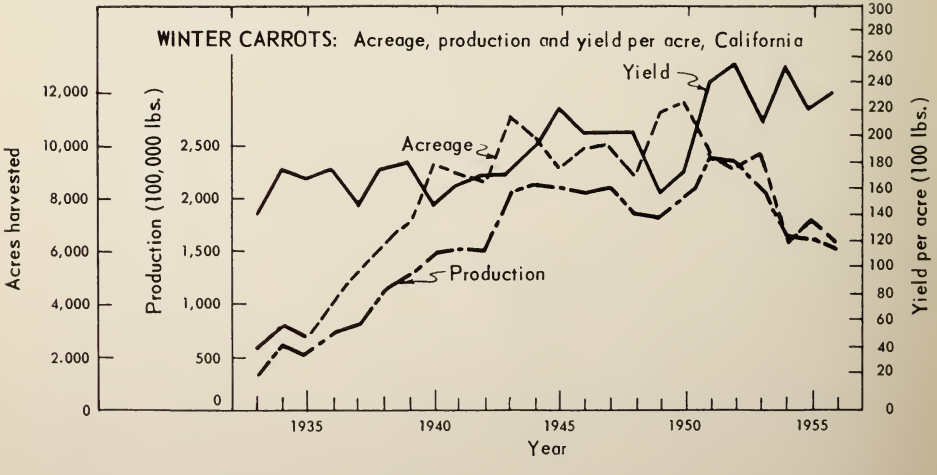


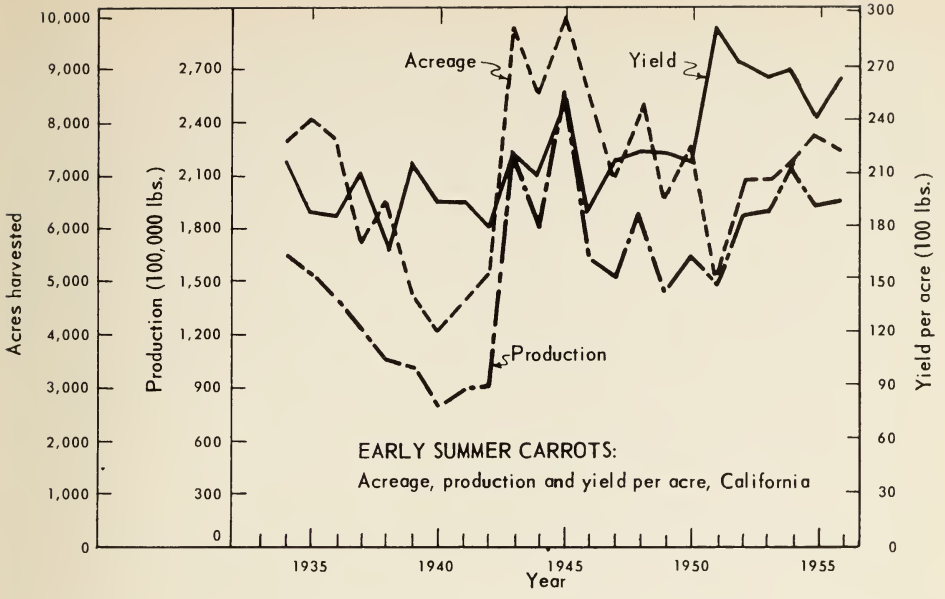
CARROTS

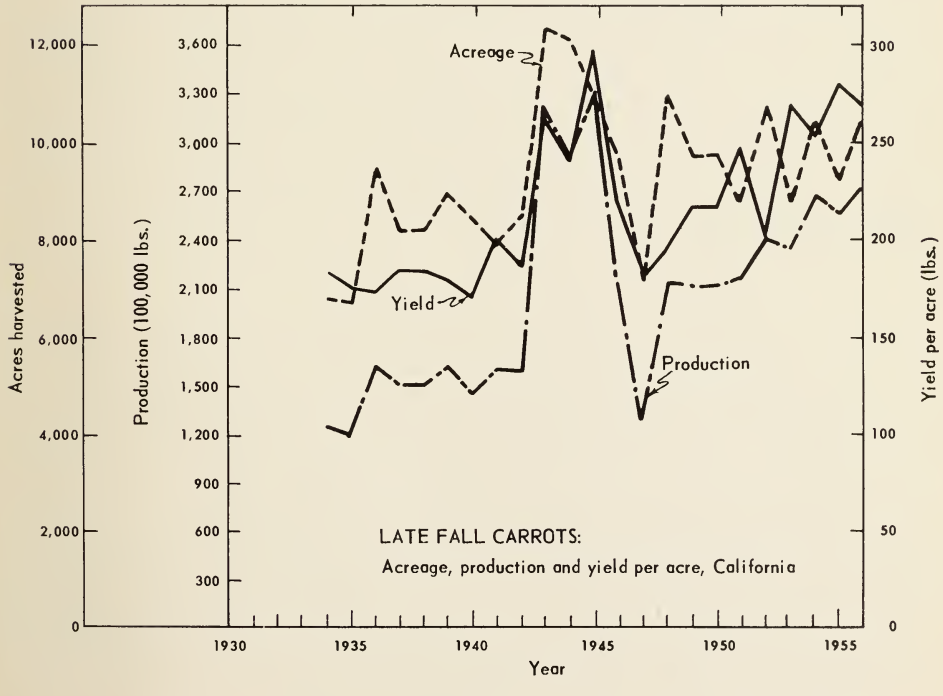
California is a major shipper of carrots, in recent years producing about 40 per cent of the total U. S. crop. Carrots in California are grown in three seasons: 1) *winter*, harvested from about December 1 to June 10; 2) *early summer*, harvested from about May 20 to August 31; and 3) *late fall*, harvested from about September 1 to February 28. Shipments from California during the winter originate from the desert valleys (Imperial, Coachella, and Palo Verde) in Imperial and Riverside counties. The chief competitor with southern California in the winter season is Texas. While Texas has roughly double the carrot acreage of California, production from the two states has been nearly equal until recent years. California early summer carrots are produced primarily in the Central Coast area, particularly the Salinas–Watsonville and Santa Maria areas. Late fall carrots are produced in those two districts plus the San Joaquin Valley and southern California. Early summer and late fall carrots from California have relatively little direct competition in their main shipping months. However, shipments of spring carrots from Arizona, late summer carrots from eastern states, and early fall carrots from western and midwestern states overlap with California carrots to some extent.

Winter carrots

Acreage and production of winter carrots in southern California increased rapidly to World War II, leveled off, and since 1950 have declined. Chief reason for the decline has been increasing competition from Texas, especially in eastern and midwestern markets. The almost complete changeover from bunched to topped carrots has allowed carrots from the lower Rio Grande Valley in southern Texas to compete strongly with carrots from southern California with attractive tops. Of course, lower transport costs to eastern, southern, and midwestern markets have also been an advantage to Texas. Most of the sales of carrots from southern California are now restricted




Acres harvested
Production (100,000 lbs.)
Yield per acre (100 lbs.)
Acreage
Yield
Production
EARLY SUMMER CARROTS:
Acreage, production and yield per acre, California
Year


Acres harvested
Production (100,000 lbs.)
Yield per acre (lbs.)
Acreage
Yield
Production
LATE FALL CARROTS:
Acreage, production and yield per acre, California
Year

to Pacific Coast, northwestern, and Canadian markets. Annual yields of California winter carrots have been quite variable, partly because of cold-weather damage (in 1949 and 1950, for example). The general level of yields, however, has risen as producers have improved cultural practices and management.

Early summer carrots

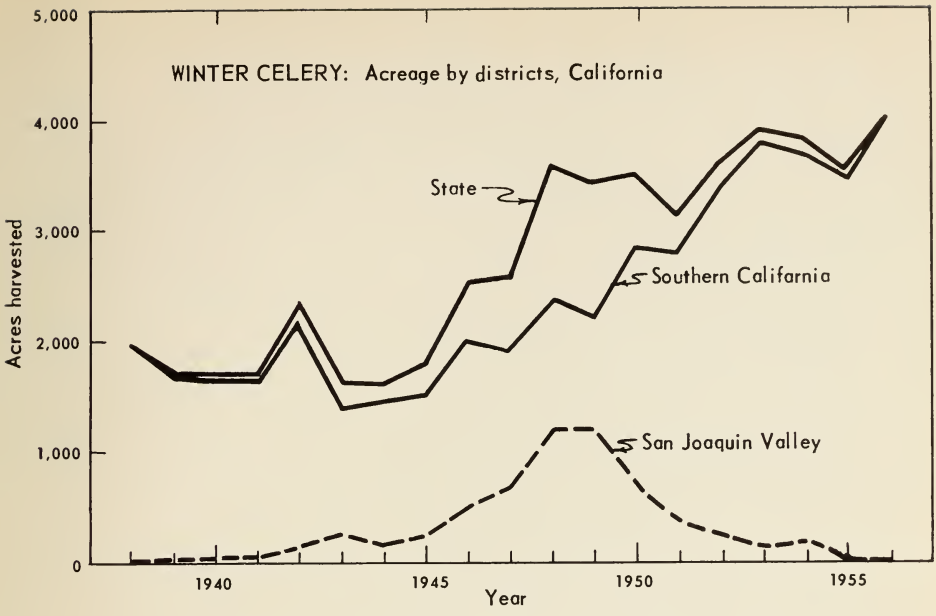
The acreage of early summer carrots increased sharply in 1943, in response to high grower prices in 1942 and a strong demand during World War II. Since then, however, acreage declined to prewar levels. Year-to-year acreage changes appear closely associated with prices of the previous year. Acreage has shifted from southern California (mainly Los Angeles, Santa Barbara, and Ventura counties) to the Central Coast area (primarily Salinas Valley). Accompanying these acreage shifts has been a gradual, and irregular, increase in average yields. Production has been quite erratic, following general changes in acreage.

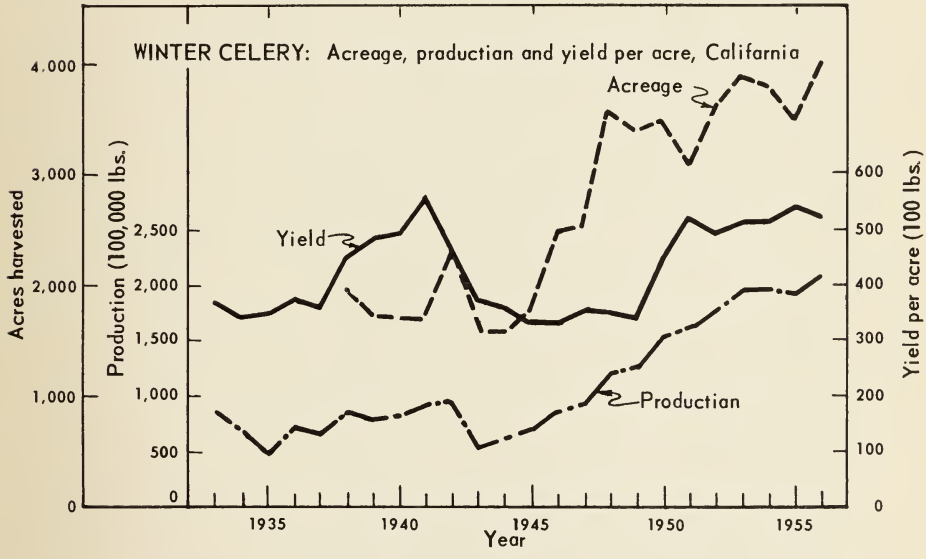
Late fall carrots

Acreage changes in late fall carrots are similar to the changes in early summer carrots: acreage shot up in 1943, stimulated by high prices. Since the war, acreage has dropped off, with annual fluctuations primarily reflecting previous prices. Shifts in the location of late fall acreage also parallel the shifts in location of early summer acreage. The Central Coast area (primarily Salinas Valley) has increased relative to southern California (Los Angeles, Santa Barbara, and Ventura counties) and the San Joaquin Valley. The general trend in yields has been up, because of improved cultural practices and the shift to the higher-yielding coastal valleys. Exceptionally high yields in 1943–45 resulted from a combination of 1) exceptionally favorable weather, and 2) a lower culling rate to increase tonnage at the prevailing high prices. Total production reflects wide swings in acreage and yield during and after the war. Aside from 1943–45, late fall carrot production has generally increased since 1934.

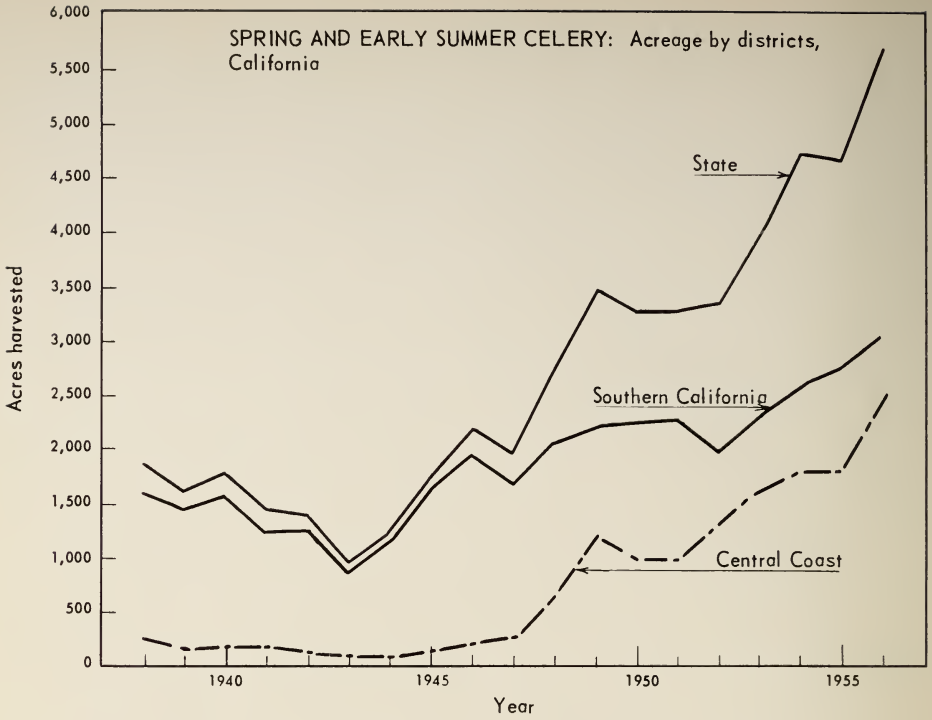
CELERY

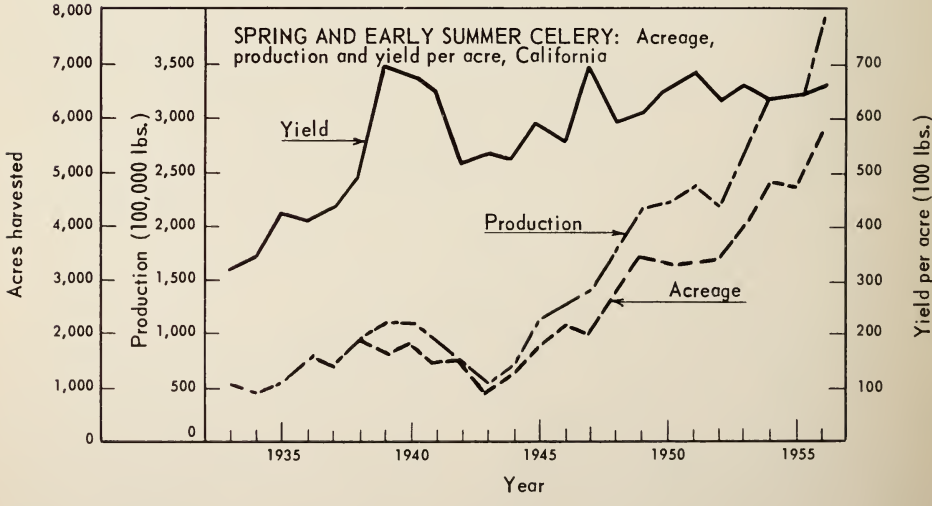
Celery production in California is localized according to shipping season. Annual production is divided into the following seasons and approximate harvesting dates: 1) *winter*, harvested November 20 to March 31; 2) *spring*, harvested April 1 to August 31; 3) *early summer*, harvested June 20 to August 31; and 4) *late fall*, harvested September 1 to January 15. For our analysis, the *spring* and *early summer* seasons are combined in a *spring and early summer* season. Celery harvest begins with the winter season in the south coast area of southern California and moves generally north along the coast through the spring, early summer, and late fall seasons. Roughly one fourth of the total California acreage is planted to winter celery, one fourth to spring and early summer celery, and about one half to late fall celery. However, the relative acreage during the first two seasons has been increasing.

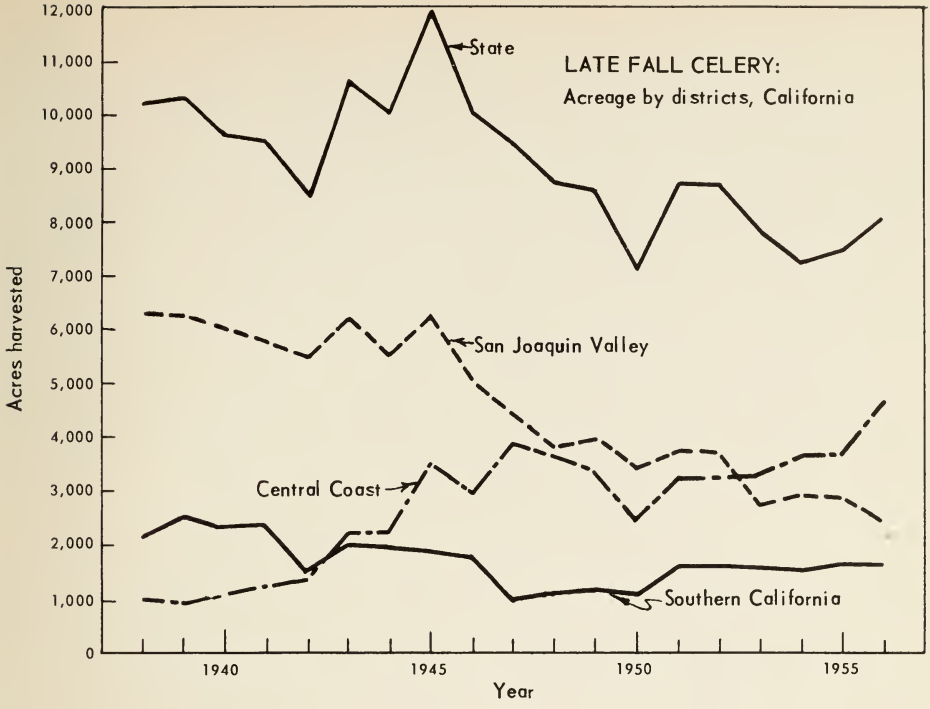


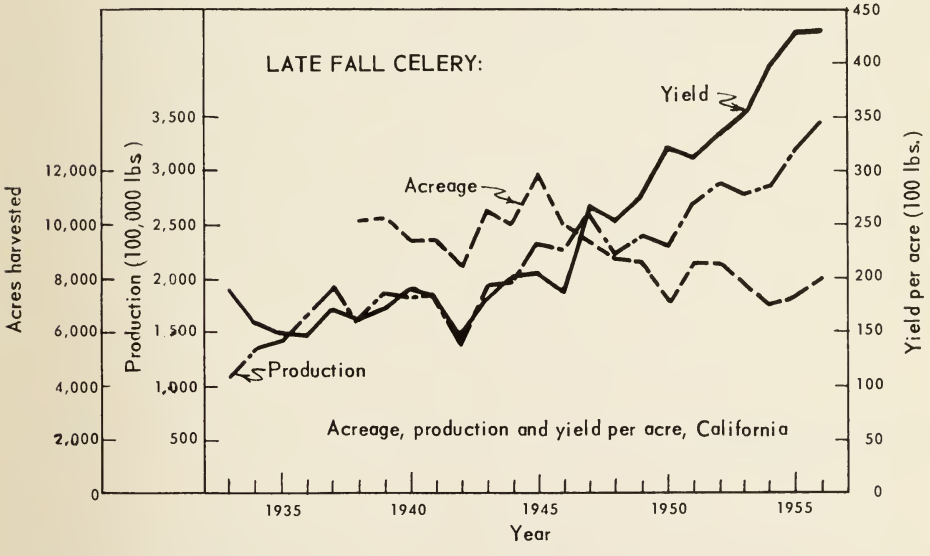


A sizable proportion of the California celery crop is shipped directly to west coast urban centers. Much of midwestern and eastern demand is met by Florida, Michigan, and several eastern states. Harvested acreage of both winter and spring celery in the United States is divided about one third to California and two thirds to Florida. However, California has a higher proportion of total production because of substantially higher yields, particularly in the spring. Michigan is the chief competitor with California in the early summer market;


SPRING AND EARLY SUMMER CELERY: Acreage by districts, California
State
Southern California
Central Coast
Acres harvested
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1940
1945
1950
1955
Year


SPRING AND EARLY SUMMER CELERY: Acreage, production and yield per acre, California
Yield
Production
Acreage
Acres harvested
Production (100,000 lbs.)
Yield per acre (100 lbs.)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
3,500
3,000
2,500
2,000
1,500
1,000
500
0
700
600
500
400
300
200
100
1935
1940
1945
1950
1955
Year


LATE FALL CELERY:
Acreage by districts, California
State
San Joaquin Valley
Central Coast
Southern California
Acres harvested
Year
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1940
1945
1950
1955


LATE FALL CELERY:
Yield
Acreage
Production
Acreage, production and yield per acre, California
Acres harvested
Production (100,000 lbs.)
Yield per acre (100 lbs.)
Year
12,000
10,000
8,000
6,000
4,000
2,000
0
3,500
3,000
2,500
2,000
1,500
1,000
500
450
400
350
300
250
200
150
100
50
0
1935
1940
1945
1950
1955

each state has about one third of the total acreage, with the remaining third divided among New Jersey, Ohio, and Massachusetts. California is the only important supplier of late fall celery.

Winter celery

Southern California (mainly the Chula Vista–Oceanside district, in San Diego County, and the Venice–Oxnard and Orange County districts) provides the major shipments of winter celery in the state. Harvested acreage in these areas is more than double prewar levels. High wartime demand encouraged plantings in Tulare County, in the San Joaquin Valley. This area, however, has since gone out of production, because of damaging frosts and cold weather. Average yields of winter celery have not increased appreciably since the 1940–41 level. In fact, average yields were depressed during the late forties as low-yielding Tulare County briefly entered the picture. Total production, however, has steadily increased since 1940 as acreage increased.

Spring and early summer celery

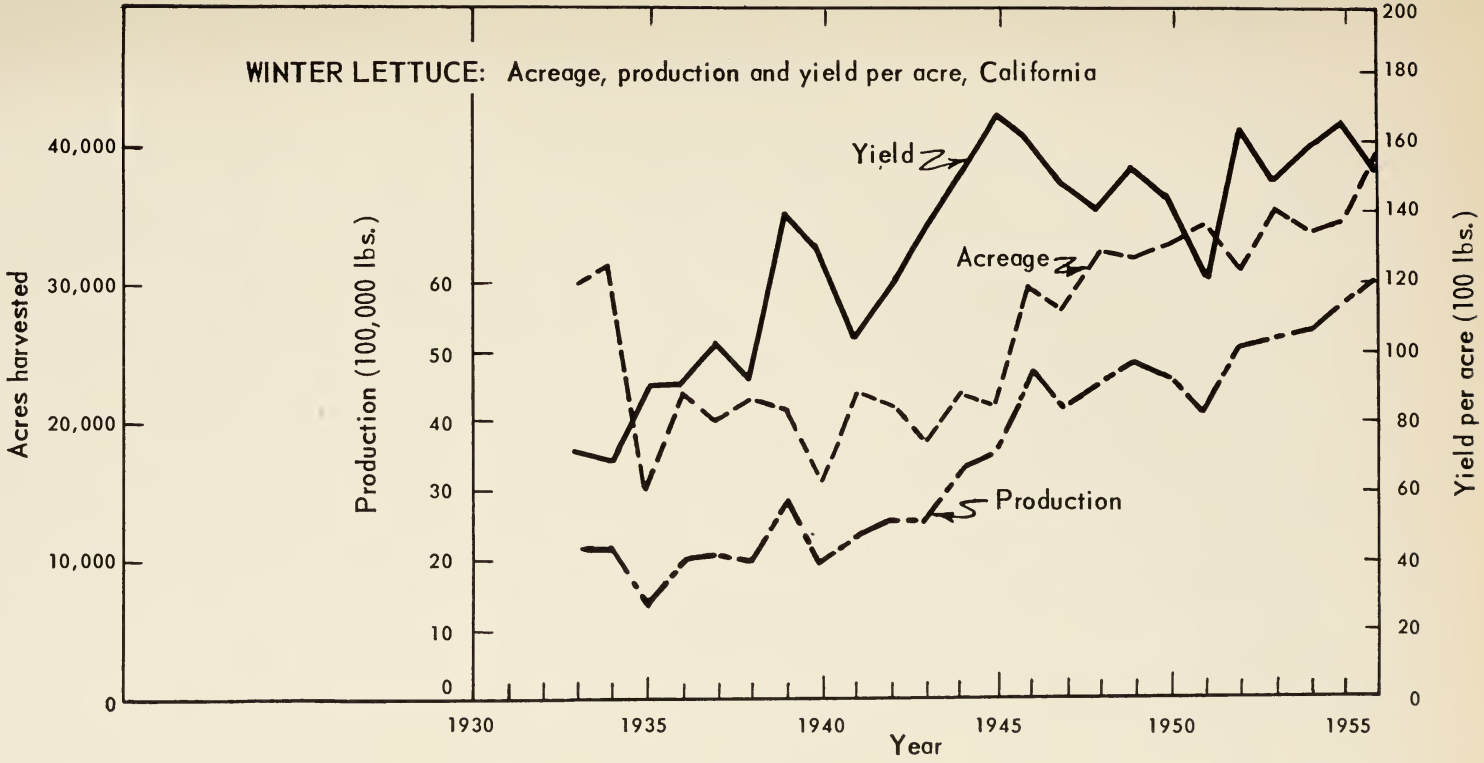
The Venice–Oxnard and Orange County districts produce most of the California spring celery crop. The early summer crop comes from several areas including the Oceano area, of San Luis Obispo County, the Santa Clara Valley, and the Salinas–Watsonville district. Since World War II, acreage and production of spring and early summer celery from California has increased both absolutely and relative to Florida, Michigan, and other areas. Reasons for the relative increase in California appear to be higher yields, more attractive packaging, and a steadier source of supply. Acreage growth has been faster in the Central Coast than in southern California because of new slow-bolting varieties that can be set out early in cold climates. Celery yields for the spring and early summer season have increased as producers have improved cultural practices, including fertilization and pest and disease control. Total production has increased sharply as both acreage and yields have increased.

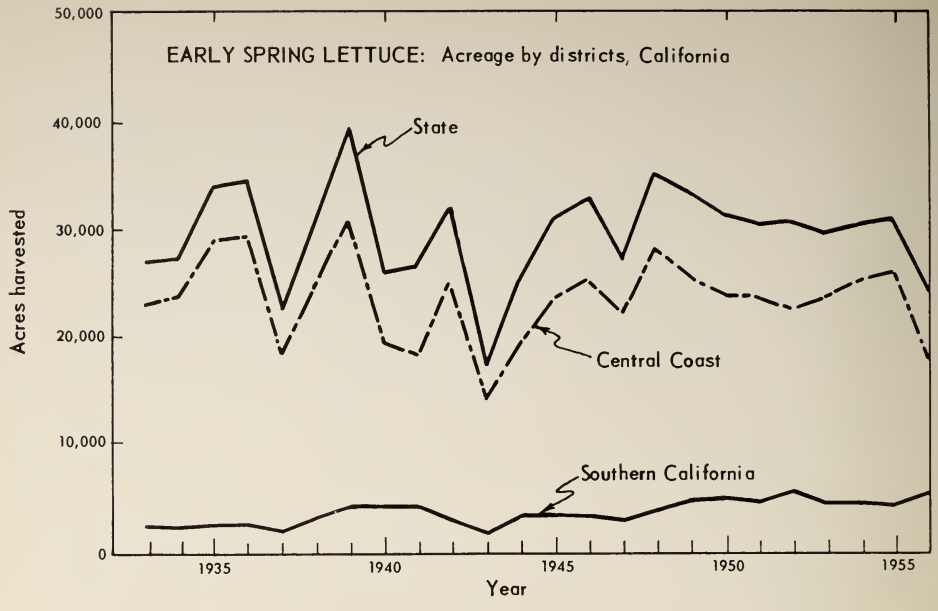
Late fall celery

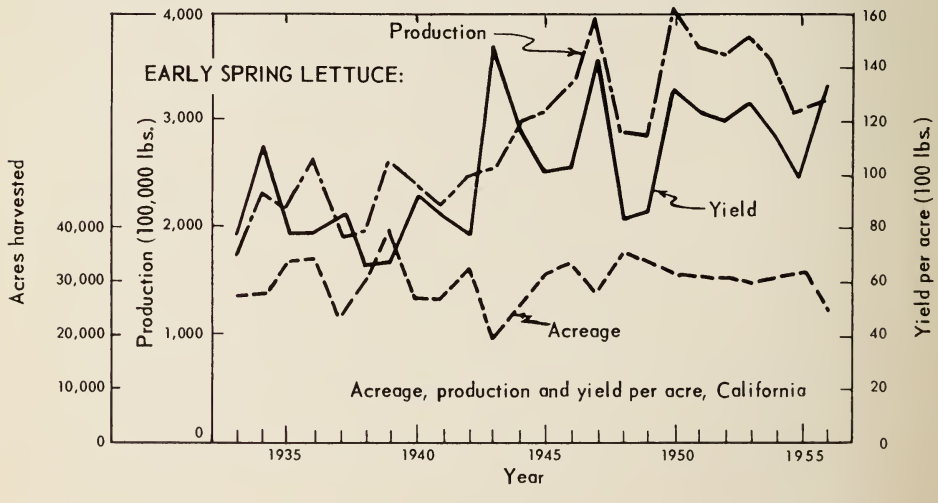
Late fall celery is produced in several areas of California. There is a shift, however, from the San Joaquin Valley (the Delta area) and southern California (mainly Los Angeles County), with further concentration in the Central Coast area (Santa Maria, Salinas–Watsonville, and Santa Clara Valley districts). Important factors in the shift have been higher yields in the Central Coast area and the development of direct seeding. Late fall celery yields have increased sharply because of improved cultural practices and the shift of production to the higher-yielding coastal valleys. The uptrend in yield has more than offset the drop in acreage.

LETTUCE

California is by far the most important single commercial lettuce-growing area in the United States, averaging slightly over 60 per cent of the national total. Another 15 to 20 per cent is produced in Arizona. Sharp increases in lettuce production in these two states since the early thirties have been matched by increases in other areas, leaving the California–Arizona share of the market about constant. However, there have been significant shifts in the location of production

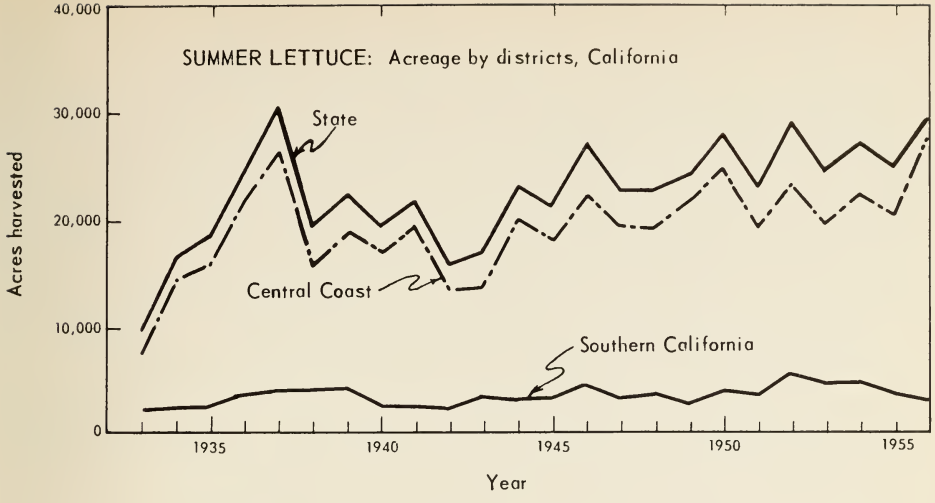

WINTER LETTUCE: Acreage, production and yield per acre, California
Acres harvested
Production (100,000 lbs.)
Yield per acre (100 lbs.)
Year
Yield
Acreage
Production
40,000
30,000
20,000
10,000
0
60
50
40
30
20
10
0
200
180
160
140
120
100
80
60
40
20
0
1930
1935
1940
1945
1950
1955

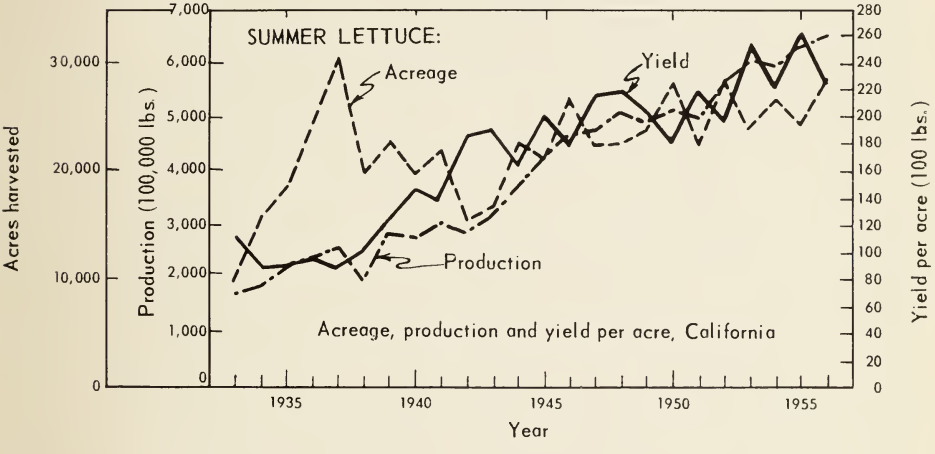




and the season of marketings in the western lettuce industry.

Since lettuce is consumed fresh, the industry has developed so as to provide fresh supplies every month of the year. Because it is perishable, market timing is vital in determining prices and returns. Excellent crops are sometimes left unharvested if prices are low. California lettuce data are reported by the following seasonal groups: 1) *winter lettuce*, harvested November 20 to April 15; 2) *early spring lettuce*, harvested March 25 to May 31; 3) *summer lettuce*, harvested June 1 to August 31; and 4) *early fall lettuce*, harvested September 1 to December 15. In all four seasons, California is the most important lettuce-producing state. California's two major lettuce areas are the Salinas–Watsonville–Hollister

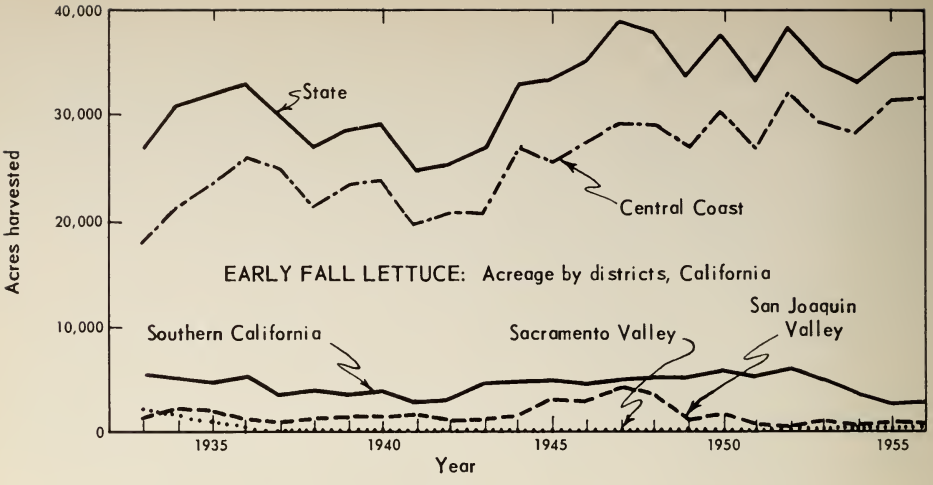


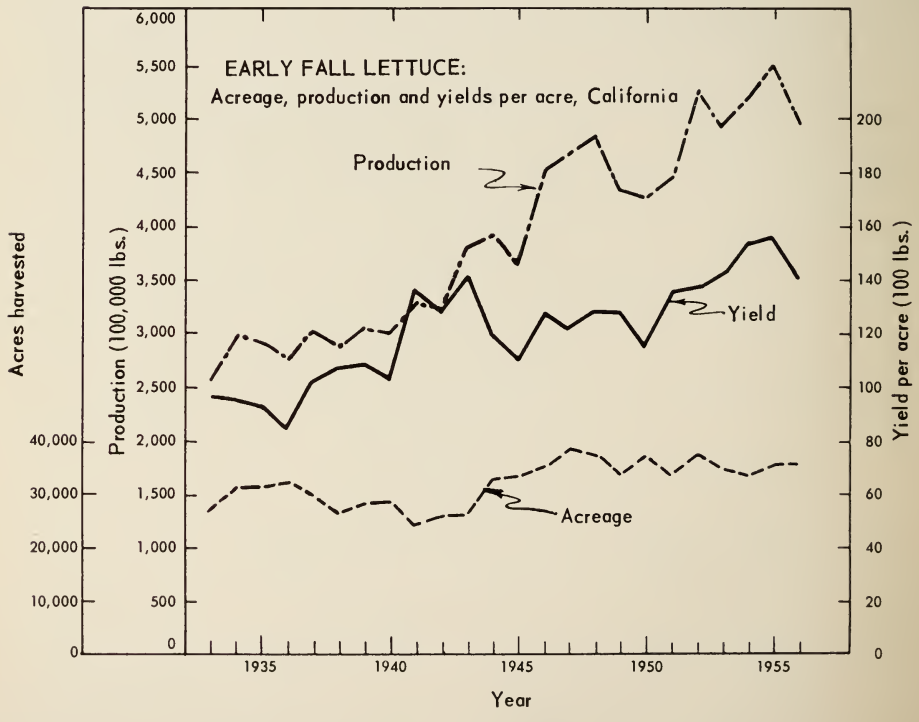


district (mainly in Monterey, San Benito, and Santa Cruz counties) and the Imperial Valley. The former district ships lettuce during spring, summer, and fall; Imperial Valley ships a winter crop. Before World War II, the various lettuce-producing areas of California and Arizona had well-defined marketing periods. In recent years, however, lettuce shipments from the major districts have overlapped increasingly as producers have attempted to extend their shipping seasons. Production in new districts has also impinged on the markets of established districts.

Winter lettuce

Imperial Valley supplies about 70 per cent of all U. S. commercial lettuce shipments in January and February. The Yuma (Arizona) district, along with Texas, supplies most of the remaining shipments during these months. In recent years, shipments from Imperial have pushed more heavily into the mid-December period, formerly dominated by Arizona's Salt River Valley district. Imperial Valley has also increased shipments in March, again at the expense of the Salt River Valley. However, all dis-





tricts have lost ground relative to Texas during the winter. About three fourths of Texas' total shipments move to market during October, December, and January. Rapid expansion in Texas has been favored by lower production costs and shorter distances to local and eastern markets. However, uncertainty of weather is a limiting factor.

Acreage of winter lettuce in California

(Imperial Valley) has expanded rapidly since the thirties. This over-all growth has been made possible by an increased demand for winter lettuce. Yields per acre, though highly variable from year to year, have trended strongly upward. Factors contributing to the yield increase have been more intensive cultivation and improvement in production practices such as disease control and fertilization. In consequence of increases in both acreage and yields, production has increased since about 1940.

Early spring lettuce

Most of the early spring lettuce crop is produced in the Salinas–Watsonville–Hollister area, of the Central Coast. The Blythe area in southern California, however, has been producing an increasing proportion of the total. The peak of shipments from the Salinas area has shifted from April to May as the Salt River Valley area has moved into the earlier part of the period. Also contributing to the shift toward a shorter spring season in Salinas have been 1) adverse weather that often delays April harvest, and 2) greater demands for lettuce in May because of higher temperatures. Because of this shift toward later spring marketings (which now extend into the period of "summer" lettuce) the acreage of early spring lettuce has not increased. Year-to-year fluctuations in acreage appear highly correlated with prices received in the previous year. In general, yields have trended upward. Wide fluctuations before 1950 were partly due to disease, primarily lettuce mosaic and tipburn. The Great Lakes variety, adopted in about 1948, has since provided more consistent yields. With acreage at a relatively constant level since 1933, production changes mainly reflect changes in yields per acre.

Summer lettuce

The Salinas area is the major commercial shipper of lettuce during June, July, and August, though the Santa Maria area is important in supplying California markets. In other parts of the country, however, "home-grown" supplies trucked to local markets increase during the summer. Despite increased competition from areas closer to the major consumption centers, Salinas Valley is likely to remain the dominant producer of high-quality summer lettuce because of its cool summers relative to other areas. Acreage of summer lettuce in California has fluctuated about a relatively constant level since the mid-thirties. Yields, however, have risen sharply, because of greater use of fertilizers, insect control, and improvements in other cultural practices. A shift to the Great Lakes variety, in about 1948, has also influenced yields. Because of yield increases, total production has increased steadily since 1933.

Early fall lettuce

The Salinas – Watsonville – Hollister area is also the major producer of early fall lettuce. Shipments from this area in November and December, however, have declined as competition from the Salt River Valley and Yuma area has increased. Thus, both the early spring and late fall shipping seasons for Salinas lettuce have been shortened by competition from Arizona. Despite the shorter fall season, the acreage of fall lettuce in the Salinas area has increased slightly. Concentration of the marketing in September and October has also contributed to increased yields, since rain in the coastal area is often unfavorable to November and December marketings. Total production of early fall lettuce in California has increased sharply as both acreages and yields have increased.

POTATOES

Potatoes are grown commercially in all states, but with only 12 states supplying about three fourths of total U. S. production. The major producers are five western states (California, Oregon, Washington, Idaho, and Colorado), four central states (Minnesota, North Dakota, Wisconsin, and Michigan), and three eastern states (New York, Pennsylvania, and Maine). Since the mid-thirties U. S. acreage has dropped steadily. However, tremendous increases in potato yields have offset acreage declines so that total production has remained about the same. Reasons for the yield increase are: 1) shifts from low-yielding to high-yielding areas, 2) shifts from small, noncommercial growers to large, commercial growers, 3) increased irrigation and fertilization, new varieties, and more efficient control of insects and disease, and 4) generally favorable growing conditions. U. S. potato consumption has remained high because of population increases while per capita consumption has steadily dropped (from 135 pounds in 1930–35 to 100 pounds in 1956). An increasing proportion of the total supply goes to processing, mainly potato chips.

Potato production in California is reported in two classifications: 1) *late spring potatoes*, harvested from about April 10 to July 31 (mainly May–June); and 2) *late potatoes*, harvested from about July 20 to March 15 (mainly August–October). California is the main supplier of late spring potatoes (harvested May 15 to June 30), in this period producing more than all other states combined. Output of California late spring potatoes exceeds that of late potatoes, a characteristic not duplicated by other major producing regions.

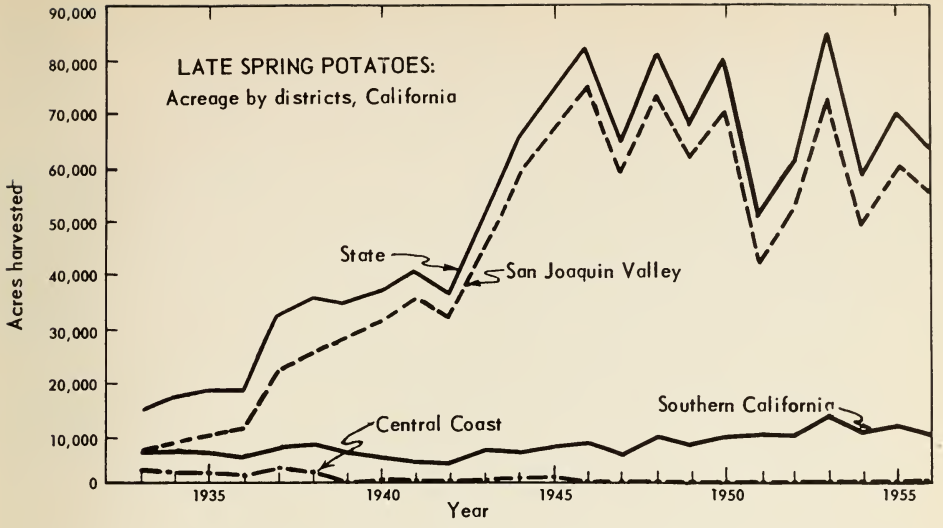
Late spring potatoes

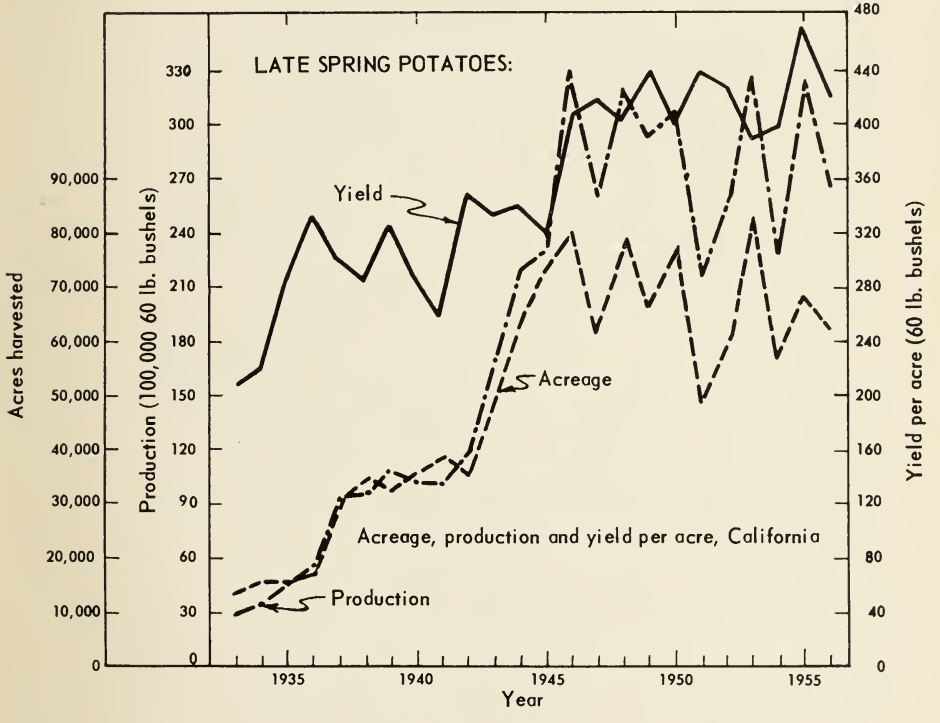
The Kern County district (including the southern part of Tulare County as well as central and northern Kern County) is the heart of the California early potato area. The leading variety is the White Rose, marketed under the name "Long White." The White Rose is a long, elliptical potato with a smooth, white skin, grown best in light soil with uniform moisture, usually supplied by irrigation. Soil and climate that favor the White Rose have encouraged production in this area. However, the particular advantage held by Kern County growers lies in their ability to market new potatoes ahead of other areas.

Rapid expansion of the Kern County potato district in the late thirties and early forties was encouraged by an increasing level of prewar and wartime demand. The "sawtooth" pattern of acreage since the war largely reflects the response of producers to alternately favorable and unfavorable prices in the previous year. Increases in yields since the thirties can be attributed, at least in part, to the relative shift of acreage into higher-yielding Kern County, increased fertilizer use, adoption of improved irrigation and soil management practices, and better disease and pest control. The general trend and year-to-year changes in total production closely follow those in acreage.

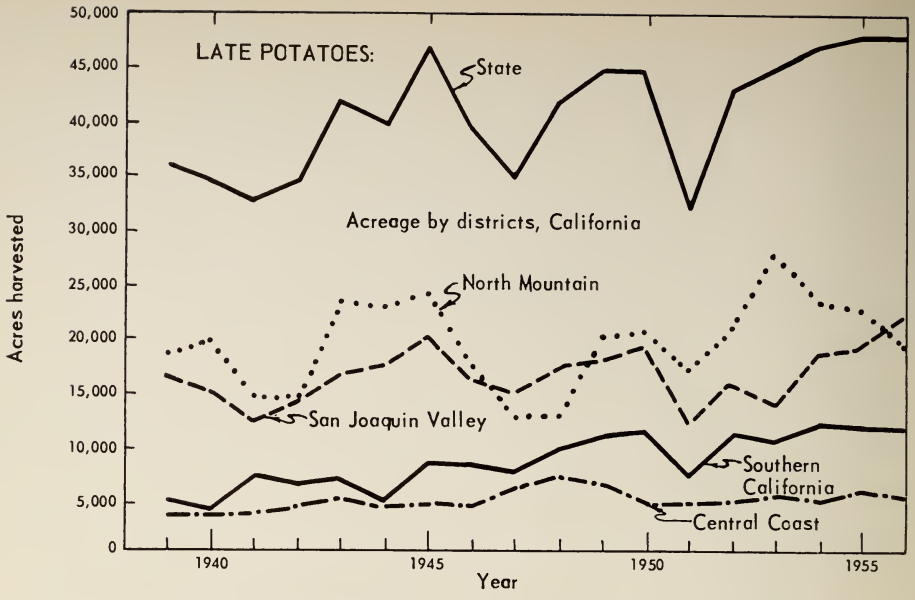
Late potatoes

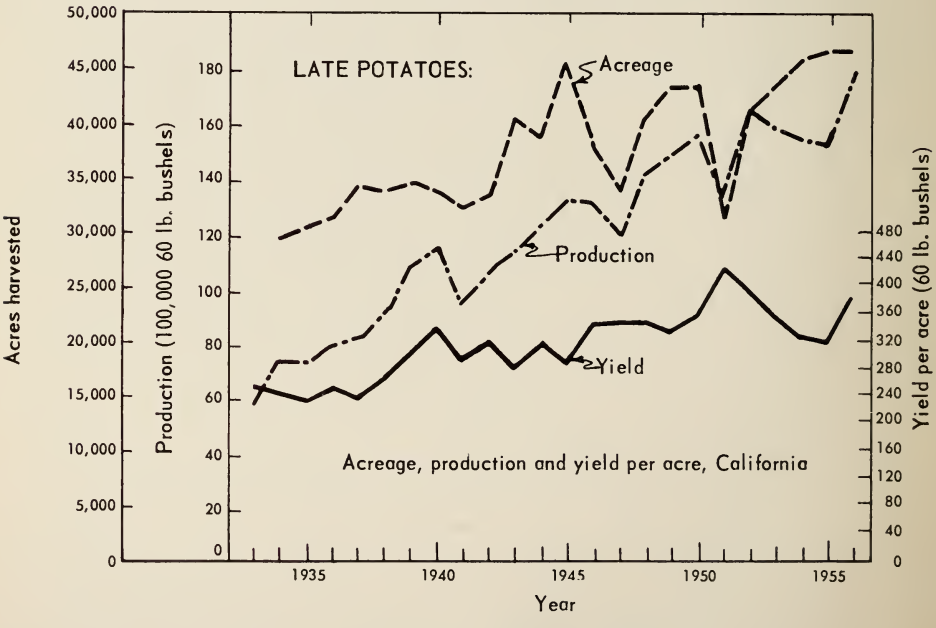
Marketings of late potatoes from the San Joaquin Delta area and Salinas Valley are heavy in August and September. In October, marketings from these two areas are supplemented by production





from Tulelake. A limited winter harvest (December–March) takes place in the southern San Joaquin Valley and southern California (mainly Riverside County). Total acreage of "late potatoes" increased substantially between the early thirties and the end of World War II. Since then, acreage has fluctuated widely but without apparent general trend or major shift in location of acreage within the state. A slight uptrend in southern California acreage (mainly





Riverside County) has been stimulated by development of the potato processing industry; the low water content of late potatoes is particularly desirable for chipping. A moderate increase in the Salinas Valley might be expected as some growers search for an alternative crop for lettuce. However, soil adapted to potatoes is relatively limited in the Salinas Valley. Yields have fluctuated widely since the thirties, but with a moderate upward trend from improvements in management and cultural practices similar to those listed for the late spring crop. As a result, total production also shows an upward trend.

STRAWBERRIES

Changes in acreage

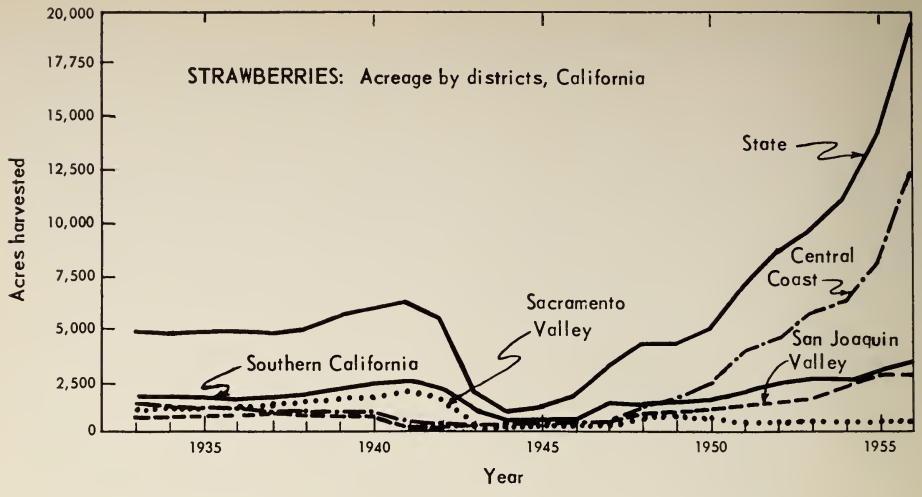
Before World War II California's strawberry acreage averaged 5,000 to 6,000 acres. During the war, Japanese sharecroppers, who formerly produced most of the strawberry crop, were evacuated from the producing areas. The lack of skilled growers accounts for the sharp dip in acreage in the war years. After the war, state acreage expanded sharply until acreage in 1956 was nearly four times the prewar level. This phenomenal growth reflects an exceptionally favorable economic picture for strawberry producers. High yields, the relatively long harvest season, and favorable prices brought high returns and stimulated new acreage. Sharecroppers still produce an important portion of the crop, but many growers have attained ownership and have shifted to a larger and more commercial type of operation.

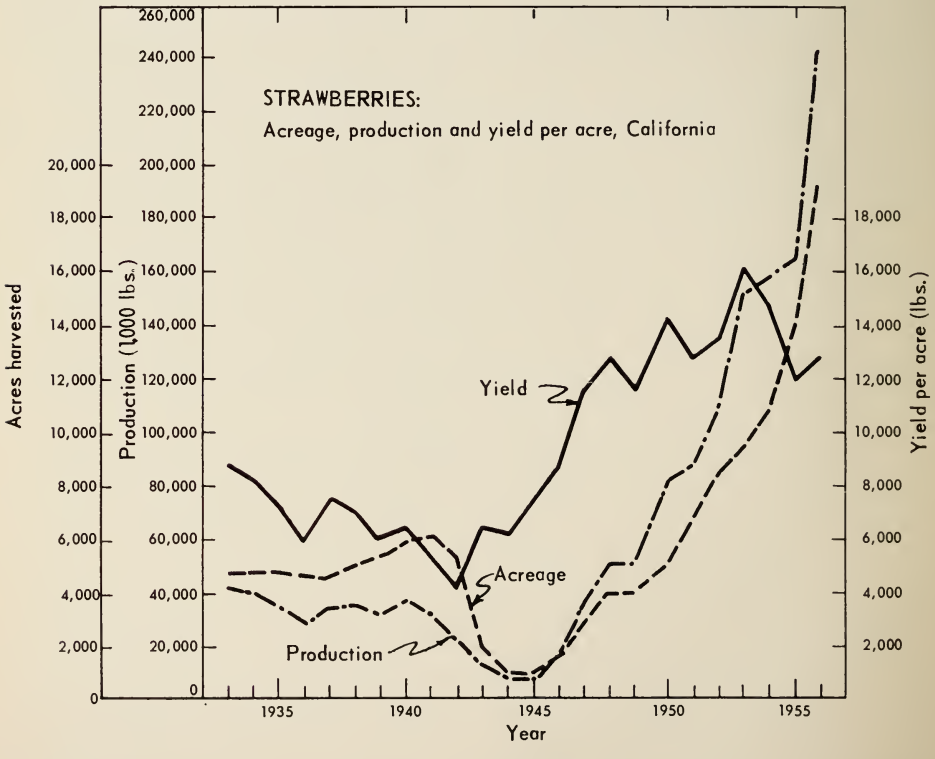
Shifts in location of production

Before the war, each of the four major producing areas of California contained a substantial share of the state's strawberry acreage. Since the war, expansion of acreage has been large in the Central Coast area and moderate in the San Joaquin Valley and southern California. The Sacramento Valley is declining to a negligible position. Expansion has been greatest in the Central Coast area, primarily because of a particularly favorable climate that allows substantially higher yields and continuous bearing of fruit throughout the summer. Only the Central Coast area can successfully grow the Shasta variety, which is superior in quality to the Lassen variety, grown in other areas of California. Areas in the San Joaquin Valley (mainly around Modesto and Fresno) have increased acreage slightly because they can produce a strawberry that comes on the market ten days to two weeks ahead of the Central Coast crop. Southern California expansion is likewise based on a seasonal marketing advantage. Production from this area (mainly in Orange and Los Angeles counties, the Oxnard Plain, and the Fallbrook area in San Diego County) reaches market even earlier than the San Joaquin Valley crop. However, extremely high land and water costs for southern California strawberry production require a premium price for the product. Strawberry-producing centers near Lodi, in northern San Joaquin County, and Florin, in Sacramento County, have lost importance and are not expected to regain it. The seasonal production peak in the Sacramento Valley coincides with that in the Central Coast; thus the Sacramento Valley has no price advantage and is at a considerable yield disadvantage. The strawberry nursery business for California is located in Tehama and Shasta counties.

Trends in yields and production

California strawberry yields declined in 1933–42, primarily because virus diseases increased in incidence and severity. The low point of 1942 also coincides with the removal of skilled Japanese from the strawberry farms. In 1945, new varieties developed by the University were released. They were well adapted to California conditions and tolerant to the then prevalent virus diseases. The sharp increase in yields until about 1949 can be largely explained by widespread adoption of these improved varieties. Favorable prices also encouraged intensification of such cultural practices as fertilization and weed control. Yield variability since 1949 is attributed primarily to





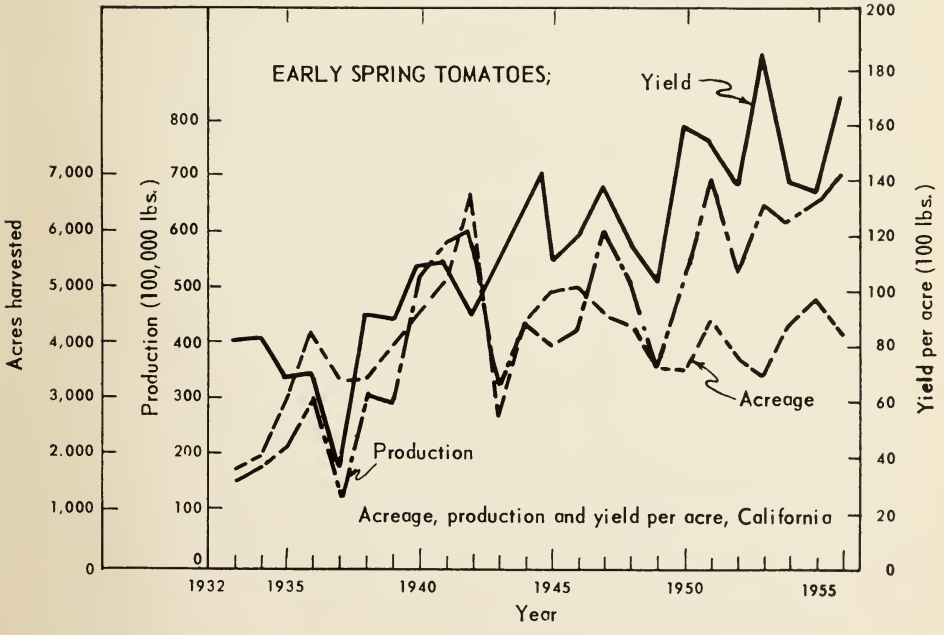
weather conditions. For example, the record yield in 1953 resulted from a season exceptionally favorable to strawberry production. In other years (1956, for example), late spring rains reduced yields. A tendency for yields to level out since 1949 may be partially explained by the following factors: 1) complete adoption of the new varieties by 1949, 2) increasing virus infestations because of concentration of acreage, 3) some shift from sharecroppers to general farming and the use of day labor, 4) lack of new land adapted to strawberry produc-

tion, and 5) failure to eliminate old plantings after production has fallen off.

The trend in California strawberry production relates directly to the yield and acreage trends discussed above. In 1955, California produced 33 per cent of the fresh strawberries in the United States and 40 per cent of the processed berries. California is expected to maintain a leading position in the strawberry industry.

FRESH TOMATOES

U. S. consumers enjoy fresh tomatoes every month of the year. Sources of seasonal supplies are determined primarily by climate in various parts of the country. During the late fall, winter and spring, Florida is the principal source. In the late fall and early spring, Texas is a major supplier, but reaches its marketing peak in late spring (May and June). Cuba and Mexico supply large quantities during the winter and spring. California is a major producer of fresh tomatoes during three seasons: 1) *early spring*, harvested from about December 1 to June 30 (mainly May–June); 2) *early summer*, harvested from about June 1 to August 31 (mainly July–August); and 3) *early fall*, harvested from about August 15 to December 31 (mainly September–October). California produces about 15 per cent of the U. S. early spring crop, one third to nearly one half of the early summer crop, and the entire early fall crop.



Early spring tomatoes

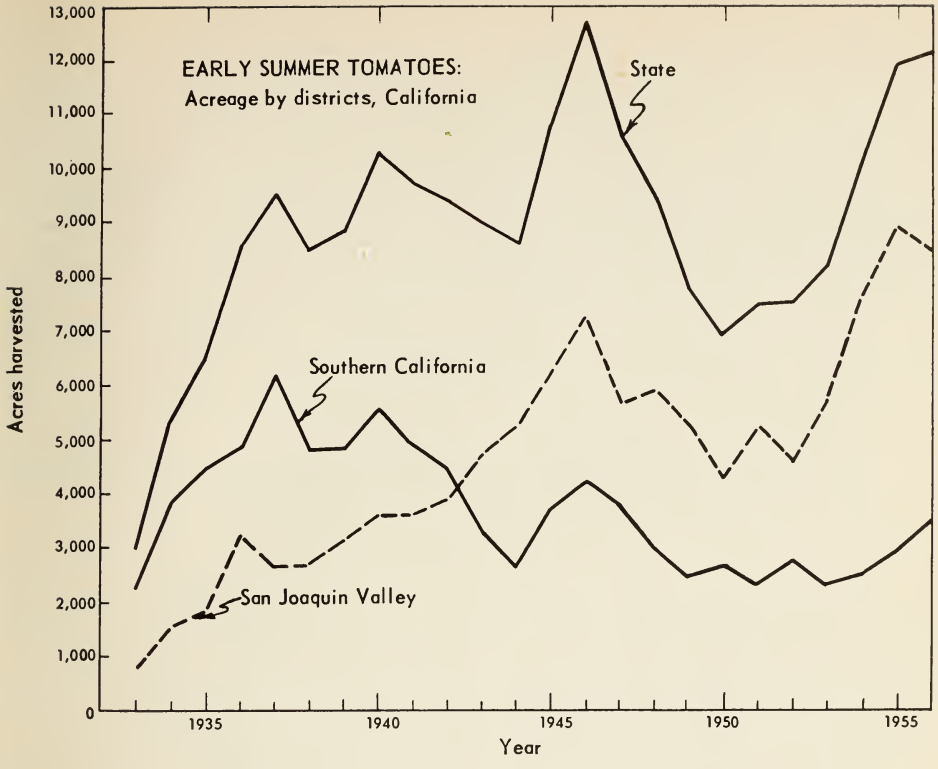
Early spring tomatoes are grown in the desert valleys of southern California under forced conditions to take advantage of the profitable early market. The main production area is Imperial Valley, where a mild climate allows early marketing and the possibility of extremely favorable prices. Coachella Valley tomatoes are marketed somewhat later, usually in May and early June. The acreage of early spring tomatoes increased in the late thirties and early forties as the prospect of wartime demands encouraged plantings. Acreage reached a peak in 1942 and was high again in 1943, but wartime labor shortages permitted harvest of only a portion of the crop. Thus, harvested acreage dropped sharply. Since the war, plantings have fluctuated around 4,000 acres. Competition from Mexico, which comes into production in midwinter (December to March), ahead of Imperial Valley, will probably influence future California early spring tomato acreage significantly. Yields of California early spring tomatoes have been trending strongly upward, principally because of improved varieties, more efficient plant spacing, better cultural practices, and the concentration of production in the hands of experienced growers. Thus, though acreage has held steady in recent years, total production has increased along with yields.

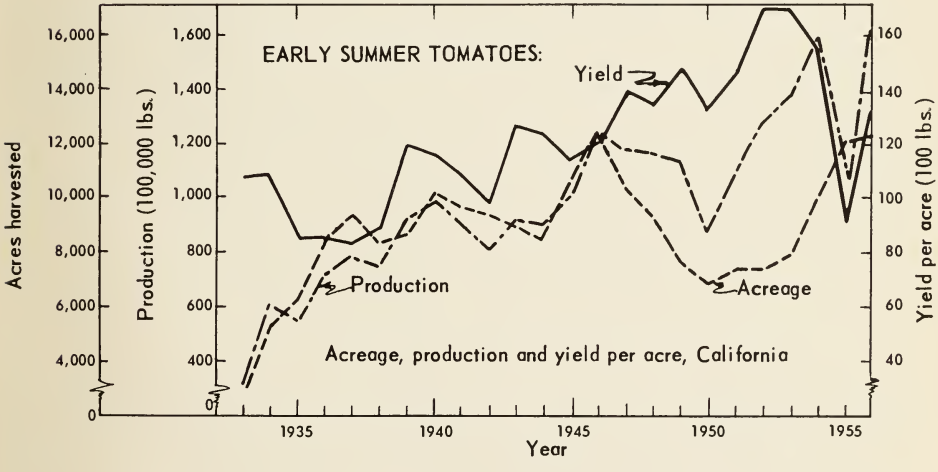
Early summer tomatoes

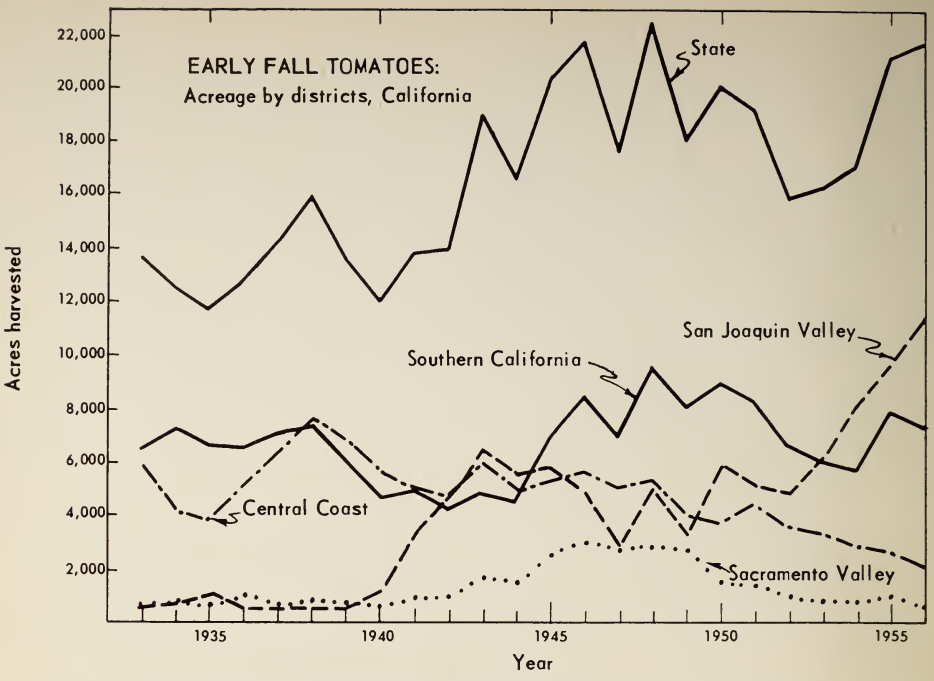
There have been several important developments in total acreage and the relocation of acreage of early summer tomatoes in California. Acreage increased sharply in the late thirties, dipped slightly during World War II, and reached an all-time peak in 1946. Strong demand and a widening market encouraged this rapid expansion. Planted acreage continued high during the late forties, but a curly top epidemic in the San Joaquin Valley—particularly in 1949 and 1950—drastically reduced the harvested acreage. Fear of further losses held acreage down in 1951–53. Since then, acreage has again increased sharply.

There has been a major shift in acreage from southern California to the San Joaquin Valley. Urbanization, high land and water costs, and competition from other crops have forced growers out of the Los Angeles–Orange County area. Some of the decline in this area has been offset by increases in San Diego County. The big shift, however, has been north into the Tulare–Fresno and Merced areas of the San Joaquin Valley, where land and water costs are lower. Tomatoes in the Tulare–Fresno area are grown on stakes on the higher ground bordering the valley floor, where good air drainage maintains mild temperatures. These tomatoes reach the market in early June. Peak marketings follow the peak season in Coachella Valley. The largest volume of early summer tomatoes, however, is produced in the Merced area, for marketing that begins near July 1. In about 1948, producers in the Merced area changed from growing tomatoes on stakes to growing them on the ground. They thereby sacrificed about two weeks in the early market, but reduced investment and labor costs substantially. Since about 1954, early summer acreage has increased considerably in the Los Banos–Patterson area, in western Merced and Stanislaus counties. Low-cost water, recently made available, is expected to encourage tomato acreage in this district.

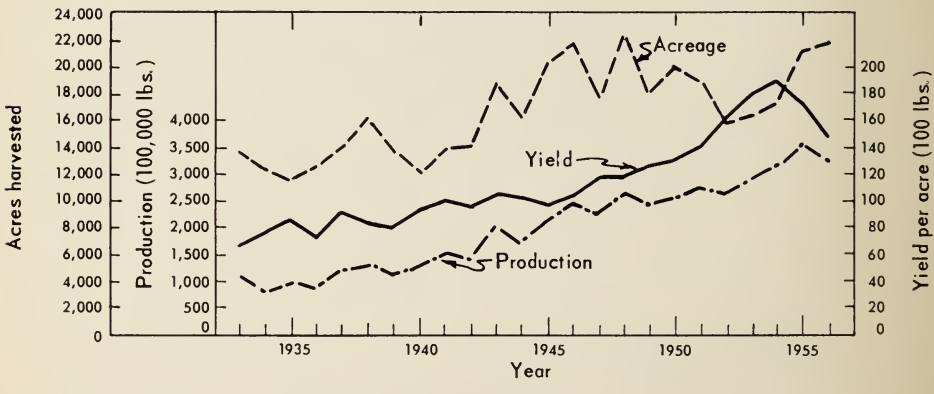
Yields of early summer tomatoes increased until 1954. Subnormal climate delayed harvest in 1955, produced erratic sizing, and reduced yields substantially. Heavy frost damage at the end of the 1956 season also caused relatively light yields. Total production, though subject to considerable year-to-year variation, has increased.


EARLY SUMMER TOMATOES:
Acreage by districts, California
State
Southern California
San Joaquin Valley
Acres harvested
Year
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1935
1940
1945
1950
1955


EARLY SUMMER TOMATOES:
Yield
Production
Acreage
Acreage, production and yield per acre, California
Acres harvested
Production (100,000 lbs.)
Yield per acre (100 lbs.)
Year
16,000
14,000
12,000
10,000
8,000
6,000
4,000
0
1,600
1,400
1,200
1,000
800
600
400
0
160
140
120
100
80
60
40
1935
1940
1945
1950
1955



EARLY FALL TOMATOES: Acreage, production and yield per acre, California



Early fall tomatoes

The marketing of early fall tomatoes in California involves high risk, depending a great deal on the date of the first frosts in the midwest and east, which end the tomato season there. Prices and acreage therefore vary widely from year to year. However, acreage shows a general increase.

There have been several important shifts in the location of acreage in the state. One major shift since World War II has been from the Sacramento Valley to the San Joaquin Valley. Low temperatures in the fall reduced the shipping quality of Sacramento Valley tomatoes and caused relocation of acreage farther south, mainly in the Stockton–Tracy–Patterson area, in San Joaquin and Stanislaus counties. The Central Coast valleys have also declined in importance—in

some areas because of subdivision, and in other areas because of competition from alternative crops. Southern California acreage has varied widely, without any general trend. Possibilities for future expansion in southern California are limited by scarcities of land and water resources. Any sizable future increases will probably take place in the San Joaquin Valley, where land is relatively more available and disease damage less likely.

Yields of California late fall tomatoes have increased since the early thirties. Contributing to the yield increase have been shifts to better soils and climate, improved cultural practices, and concentration of production among efficient producers. Total production has increased as yields have increased.

PROCESSING TOMATOES

Changes in acreage

California has grown in importance relative to other areas of the United States in processing tomatoes, increasing its share of national tonnage from about one fourth to one half in the last twenty years. The harvested acreage of processing tomatoes in California is normally about three times that of fresh tomatoes. Relatively high yields and good quality, and particularly the reliability of the California crop, have proved attractive to canners, who require a stable source.

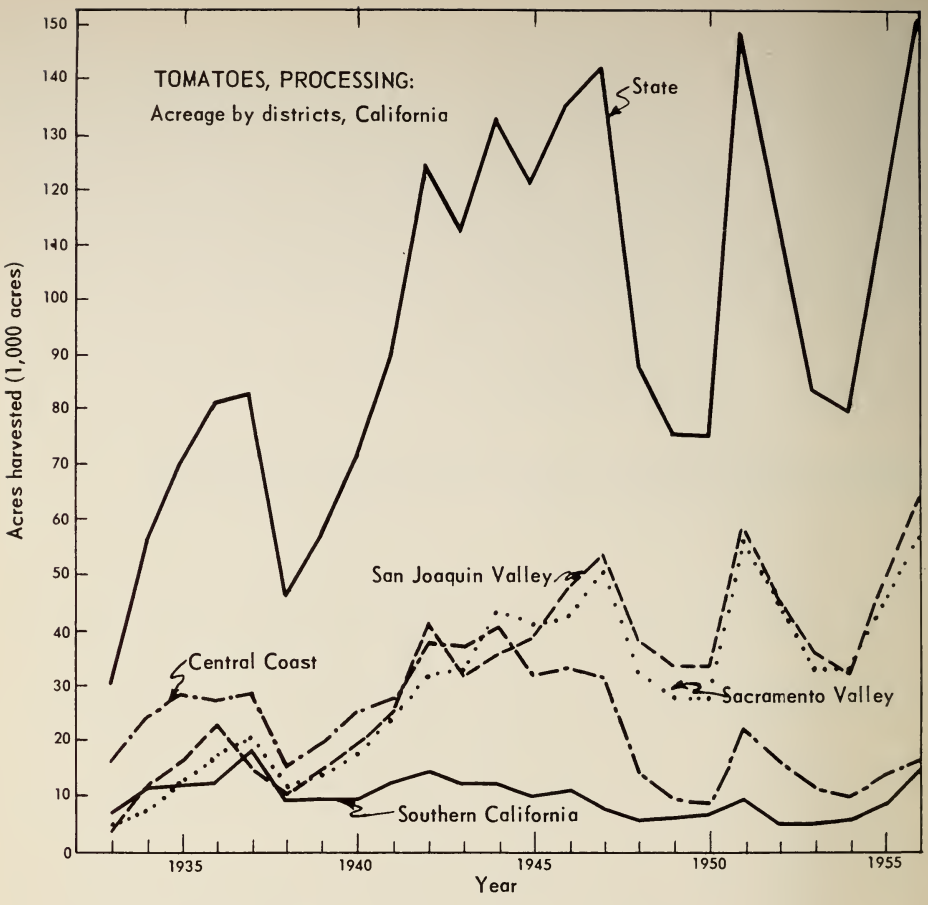
Most of the processing tomatoes in California are grown on direct contract with the processor; thus, the contract price, determined before planting, becomes the effective sale price. Prices offered by canners are heavily influenced by carry-over and prospective demands. The acreage of processing tomatoes in California expanded greatly during World War II because of sharp increases in defense demands and the prices offered producers. Acreage dips during the war were primarily the result of labor shortages and low relative prices. Slackening in postwar demand led to large carry-overs and reduced prices, forcing acreage down in 1948–50. A sharp acreage jump in 1951 reflects Korean War demand; a large acreage was planted again in 1952, but not all was harvested. These peaks in acreage and production were followed by several years of lower acreages as canners adjusted contracts to inventories. In 1956, however, acreage and production rebounded to record peaks.

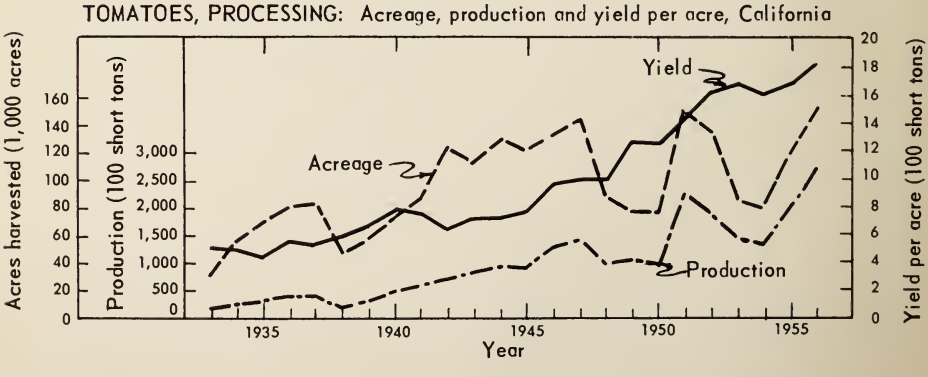
Shifts in location of production

Processing tomato acreage increased sharply in three areas during World War II: the Sacramento Valley, the San Joaquin Valley, and the Central Coast area. Since the war the Central Valley area has dominated and the acreage in the Central Coast has fallen off. The relatively higher yields in the Valley appear to have led to the shift. Southern California has never been an important segment of the state industry.

Trends in yields and production

Yields of processing tomatoes have shown a relatively rapid and steady rise over the past 20 years. The most rapid rates of increase followed adoption of the Pearson or Pearson-type tomato, in about 1942. Producers switched to Pear-


TOMATOES, PROCESSING:
Acreage by districts, California
State
San Joaquin Valley
Central Coast
Sacramento Valley
Southern California
Acres harvested (1,000 acres)
Year
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1935
1940
1945
1950
1955


TOMATOES, PROCESSING: Acreage, production and yield per acre, California
Acres harvested (1,000 acres)
Production (100 short tons)
Yield per acre (100 short tons)
Yield
Acreage
Production
Year
0
20
40
60
80
100
120
140
160
500
1,000
1,500
2,000
2,500
3,000
2
4
6
8
10
12
14
16
18
20
1935
1940
1945
1950
1955

sons mainly because pickers preferred the smaller tomato. Several other developments over the years have contributed to the rise: 1) Tomato plants have been spaced more closely. This practice increases the percentage of fruit that sets early. That increase does not add to yields directly; it does minimize the risk of losses from late-season rains. Other varieties are used to space out shipments to canneries. 2) Greater areas of land have been leveled, allowing better irrigation and more uniform yields over the field. 3) Heavy rates of fertilizer have been applied. 4) Producers have become more conscious of soil compaction problems.

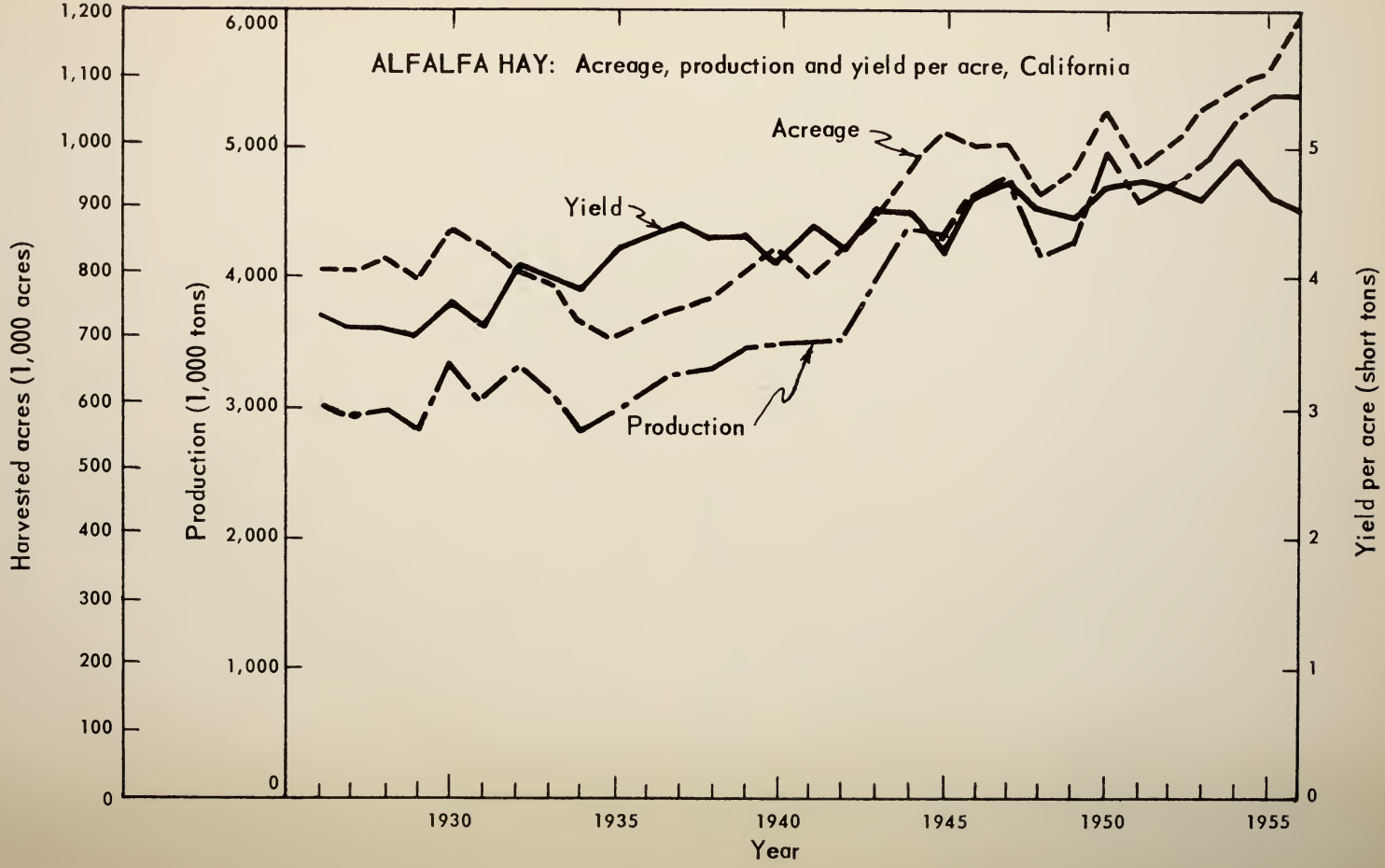
Production of processed tomatoes has increased. Acreage increases accounted for early rises in production, but yield increases have been the major cause lately. The postwar instability in production reflects drastic year-to-year changes in harvested acreage.

F I E L D C R O P S

ALFALFA HAY

Hay occupies a greater acreage of California land than any other single crop; alfalfa is California's most important cultivated forage crop. Alfalfa is grown commercially in every California county except San Francisco. Principal producing areas are the San Joaquin and Sacramento valleys and southern California. In California, alfalfa is mainly an irrigated crop, using three to six acre-feet of water per season, depending on soil, temperature, length of growing season, and other factors. Selected varieties are adapted to a wide range of soils and climates. The winter-hardy Ladak and Grimm varieties have proved superior in the northern part of the state; California common and Caliverde (an improved California common) are the principal varieties grown in the rest of the state, except in southern California, where the variety Africa predominates. A substantial proportion of the alfalfa hay grown in California is produced as a cash crop for shipment to concentrated dairy-producing and livestock-feeding centers. The Los Angeles dry-lot dairy industry draws heavy shipments of alfalfa from the Imperial Valley and the southern San Joaquin Valley. Cattle feeding operations in the Imperial Valley, recently expanded, now utilize large tonnages of alfalfa hay. The production of certified alfalfa seed has also become an important and specialized industry in recent years. Before 1946, alfalfa seed production in California varied between 2½ and 5 million pounds annually; in 1956 it was 79 million pounds—nearly half the U. S. total.

Alfalfa acreage in California has generally increased since the mid-thirties. The increase has been tied closely to expansion of the livestock industry in California, particularly the dairy industry. Acreage since 1950 has been heavily influenced by cotton acreage allotments;


ALFALFA HAY: Acreage, production and yield per acre, California
Acreage
Yield
Production
Harvested acres (1,000 acres)
Production (1,000 tons)
Yield per acre (short tons)
Year
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
6,000
5,000
4,000
3,000
2,000
1,000
0
5
4
3
2
1
0
1930
1935
1940
1945
1950
1955

alfalfa acreage increases in 1950 and 1954–56 coincide with the imposition of cotton acreage controls.

County data by years are not available, but the major alfalfa-producing districts have not changed in order of importance since 1930: the San Joaquin Valley, southern California, and the Sacramento Valley. Production within these areas is almost anywhere that irrigation water is available. The Imperial Valley, however, has the greatest single concentration of acreage. Advantages there are: 1) nearness to the southern California dairy and beef feed-lot markets, and 2) the importance of alfalfa as a cash crop in rotation with commercial vegetables.

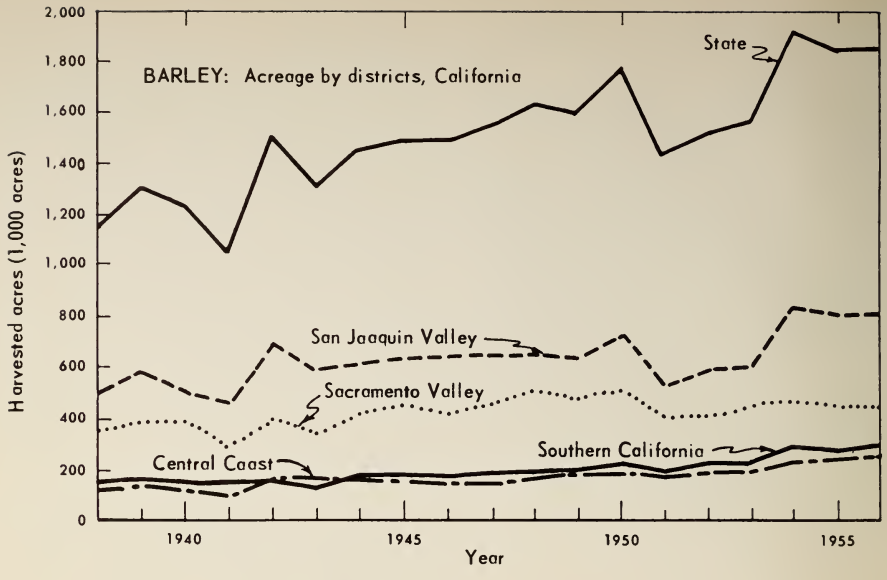
Alfalfa yields have generally increased since the late twenties. Yields over the state vary from two to ten tons per acre, depending on length of growing season, weather, soil conditions, and water supplies. The higher yields are not uncommon in the San Joaquin Valley and southern California, where more cuttings are possible per season. The gradual average yield increases in the state are probably accounted for by improved varieties, fertilization, and dusting and spray programs. Damage by the spotted alfalfa aphid has depressed yields in the past few years. Total production has trended strongly upward.

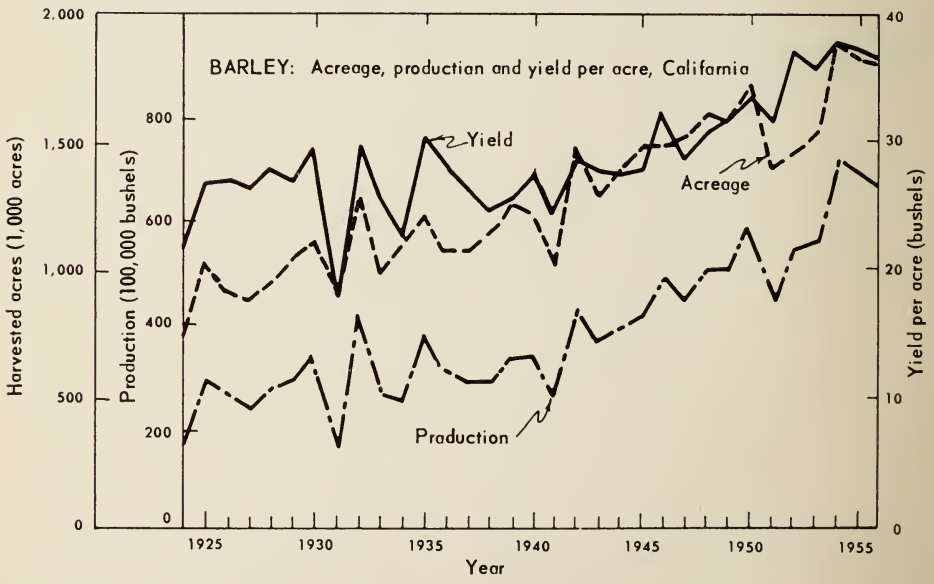
BARLEY

Changes in acreage

Barley production in the United States is centered primarily in the North Central states, where it serves as a "catch crop" for spring wheat or as a crop in rotation with oats. A secondary production area is California, which in recent years has become the top barley-producing state. Barley is by far the leading cereal crop in California, in most areas outyielding wheat, its chief competitor. Most of the California crop goes to livestock feeding and feed manufacturing industries in the state, but large tonnages are sold for malting, at a premium price over barley sold for feed. In general, breweries require a barley of proper variety, bright in color, plump and mellow, and with high germination. Parts of California are particularly well adapted to the production of high-quality malting barley. The western Sacramento Valley, the eastern side of the northern San Joaquin Valley, and the Tulelake district are particularly important. A sizable proportion (one tenth to one quarter) of California's barley is normally exported for malting and food purposes; Japan has taken major shipments for food in recent years. A declining percentage of California production is used by West Coast brewers, reflecting increased distribution in Pacific Coast markets of beer produced from midwestern malt.

Barley acreage and production in California reached an early peak just before World War I; at that time barley occupied large acreages in the Sacramento and San Joaquin valleys. After World War I, expansion of irrigation in this area brought a shift from barley to higher-income crops. This development, along with Prohibition, depressed barley acreage during the twenties. Acreage and production rose during the thirties and later, as Prohibition ended and as farmers recognized that barley was a useful rotation crop for breaking disease and





pest cycles. In recent years, barley has increased in irrigated areas when higher-income crops (such as cotton) were limited by acreage restrictions or when water was insufficient for other crops.

Shifts in location of production

Barley acreage is distributed widely over the state. The San Joaquin Valley, the Sacramento Valley, southern California (mainly Imperial and Riverside counties), and the Central Coast counties of San Luis Obispo, Monterey, and San Benito rank in that order in barley acreage. No major shifts are evident since 1938. Earlier figures are not available, but the San Joaquin Valley apparently supplanted the Sacramento Valley as the

major barley area as emphasis shifted from malt barley to feed barley. The effect of cotton acreage allotments on barley acreage is clearly shown. Barley acreage in the San Joaquin Valley increased in the cotton allotment years 1950 and 1954–56 as many acres were diverted to barley. Removal of cotton allotments in 1951–53 depressed barley acreage sharply.

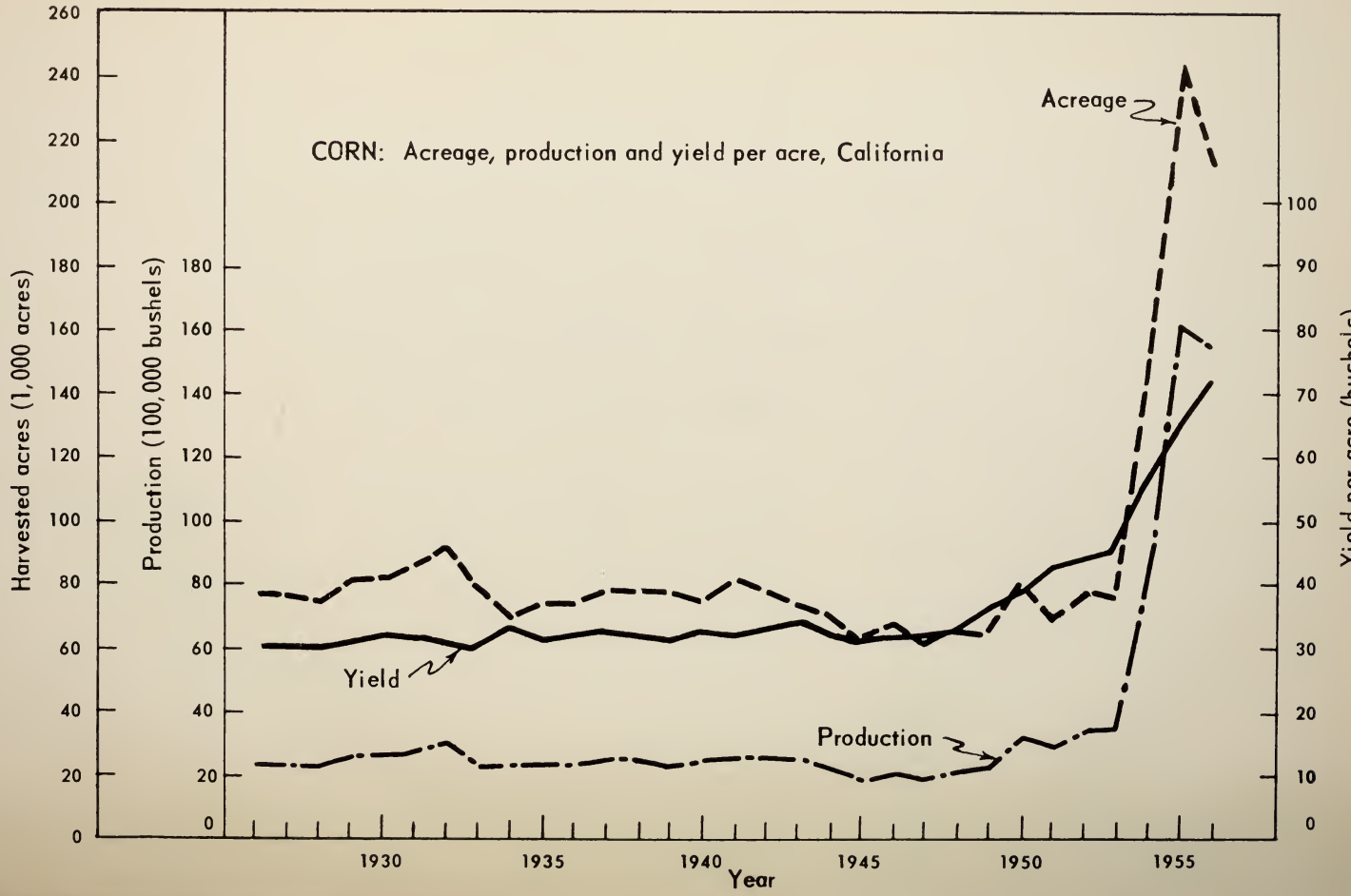
Trends in yields and production

Barley yields have gradually increased since 1940, apparently from increased use of fertilizer and herbicides, new varieties, and more timely planting. Year-to-year fluctuations in yields reflect changes in weather, particularly rainfall. Upward trends in both yields and acreage account for the sharp increase in production over the years.

CORN

Only since 1954 has corn become an important field crop in California. Even with sharp acreage increases in 1954–56, California is not a major corn-producing state. It now accounts for less than one per cent of the total value of the U. S. corn crop. Corn was one of the first crops introduced into the state. However, with the technology and varieties then available, it was considered poorly adapted to California conditions. Detailed figures are not available, but the location of production has changed somewhat. Before 1954 the Sacramento–San Joaquin Delta area was the prime area. Since then, acreage has increased moderately in the Delta area and greatly in the cotton areas of the San Joaquin Valley.

Growers restricted on cotton acreage have turned to corn as a relatively high-income alternative cash crop. Cotton allotments brought about a slight increase in corn acreage in 1950 and sharp increases in 1954–56, when cotton was again restricted. Several technical developments in corn production increased yields during 1948–53 and set the stage for that sudden upsurge. The major developments were: 1) a shift to hybrid corn varieties in about 1948; 2) development of proper irrigation and fertilization methods as well as other cultural practices; and 3) more widespread knowledge and experience among formerly inexperienced growers. Increased yields since 1954 partly reflect the increased proportion of corn acreage grown on productive cotton lands of the San Joaquin Valley. With the recent increases in both acreage and yields, total corn production has more than quadrupled from the 1950–53 level. In the future, corn acreage and production in California will probably continue to be closely related to the cotton program.


CORN: Acreage, production and yield per acre, California
Harvested acres (1,000 acres)
Production (100,000 bushels)
Yield per acre (bushels)
Year
Acreage
Yield
Production
260
240
220
200
180
160
140
120
100
80
60
40
20
0
100
90
80
70
60
50
40
30
20
10
0
1930
1935
1940
1945
1950
1955

COTTON

Changes in acreage

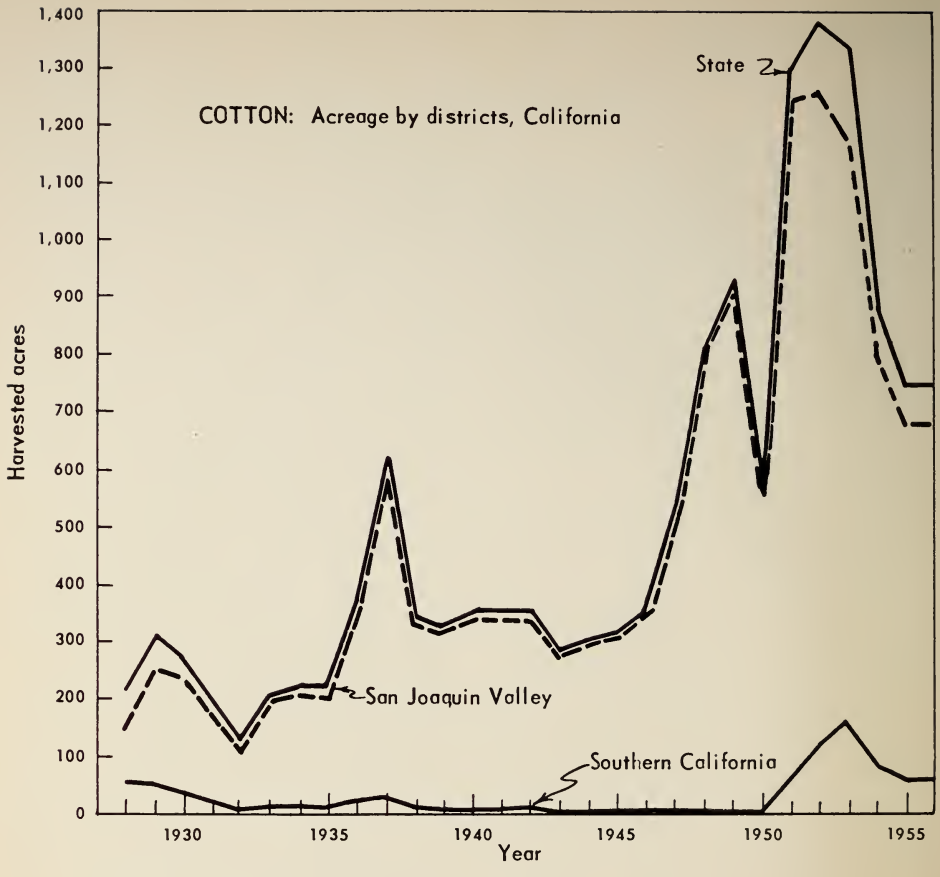
The United States is the dominant cotton-producing country of the world. In the twenties it accounted for about half of world acreage and slightly over half of world production; by the mid-fifties it accounted for only about one fifth of world acreage but over one third of world production. An increasing proportion of U. S. cotton production has been used domestically—an average of about 60 per cent in the postwar years.

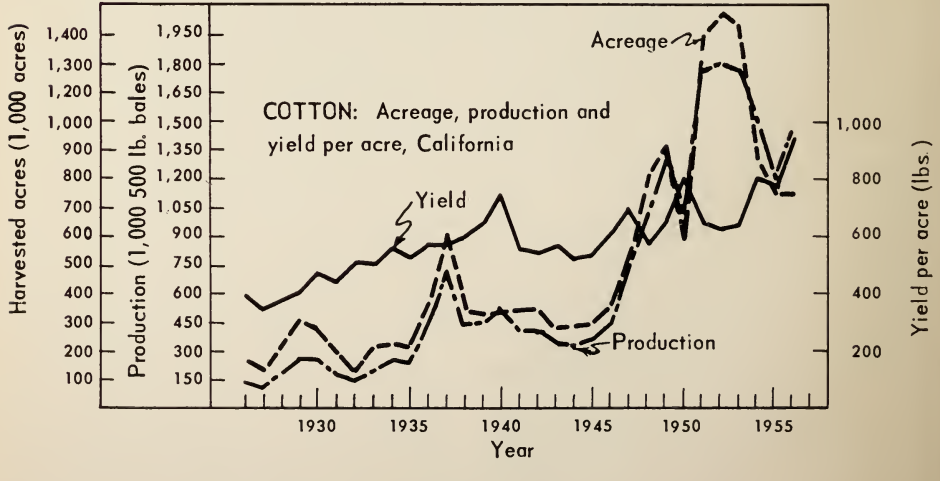
U. S. cotton production has changed significantly in the last 30 years. Large reductions in acreage have been accompanied by sharp yield increases, with production maintained at relatively high levels. In addition, important shifts have taken place between areas of the United States. The irrigated West (mainly California and Arizona) produced about 2 per cent of the U. S. total in the twenties, compared with about 20 per cent today. The Mississippi Delta areas and the high plains and lower Rio Grande Valley of Texas also increased in relative importance. The traditional cotton areas of the southwest and southeast have produced a declining proportion of the total. Relatively high yields and mechanization of the crop have favored expansion in the West. In recent years California has become the third-ranking state in production, following Texas and Mississippi. Cotton is now by far the leading income crop in California. The growers have the advantage of producing high-quality, longer-staple upland cotton ($1\frac{1}{16}$ inches or longer). The industry in the San Joaquin Valley is unique in that, by law, only the Acala variety has been grown since 1925.

Commercial cotton production became well established in California after 1910, in the Imperial Valley at first. Production later concentrated in the southern portion of the San Joaquin Valley. Acreage increased until World War II; high prices in the mid-thirties apparently induced acreage expansion, with peak acreage in 1937. Grower compliance with the cotton program reduced acreage in 1938. Acreage was static during World War II, with expansion restricted by price ceilings, shortages of harvest labor, and the relatively high priority of other crops. Immediately after, however, acreage increased sharply. Curtailment of foreign production and high domestic support prices led to major development of irrigated cotton land in California between 1945 and 1949. In 1950 acreage was restricted by allotment, but it increased sharply in the next three years. The rapid expansion in acreage in 1948–51 partly reflected increased profitability resulting from machine picking. A large proportion of the California cotton crop is now machine harvested. Acreage allotments in 1954–56 again sharply restricted California cotton acreage.

Shifts in location of production

As mentioned, cotton production in California first developed in the Imperial Valley in the early 1900's. Competition from vegetables and other crops in southern California and the development of a cotton variety well adapted to the San Joaquin Valley led to a shift. During the thirties and forties the San Joaquin Valley produced practically the entire California cotton crop. High postwar support prices and the discovery that formerly unproductive soils on the west side would produce high-yielding cotton under irrigation led to a tremendous postwar expansion of cotton acreage in the San Joaquin Valley. A sharp increase in cotton acreage in southern California (mainly Imperial and Riverside coun-


COTTON: Acreage by districts, California
State
San Joaquin Valley
Southern California
Harvested acres
Year
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
1930
1935
1940
1945
1950
1955


COTTON: Acreage, production and yield per acre, California
Acreage
Yield
Production
Harvested acres (1,000 acres)
Production (1,000 500 lb. bales)
Yield per acre (lbs.)
Year
1,400
1,300
1,200
1,000
900
800
700
600
500
400
300
200
100
1,950
1,800
1,650
1,500
1,350
1,200
1,050
900
750
600
450
300
150
1,000
800
600
400
200
1930
1935
1940
1945
1950
1955

ties) in 1951–53 reflects 1) an attempt by growers to build acreage "history" in anticipation of possible allotments, and 2) increased uncertainties of yields and prices for important competing southern California crops. Acreage allotments after 1953 caused acreage cuts in both the San Joaquin Valley and southern California.

Trends in yields and production

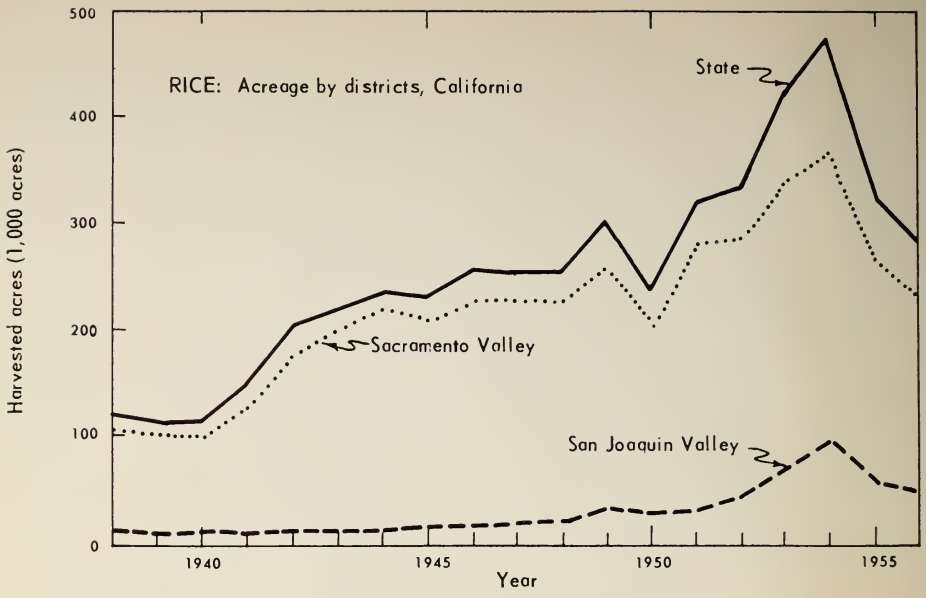
Yields trended steadily upward from the late twenties through the thirties, reaching an early peak in 1940 under exceptionally favorable weather. During World War II yields were depressed by labor shortages and unfavorable weather. Yields later increased again, but with major annual fluctuations. High yields in 1950 resulted from plantings on better soils and from more timely culture practices under restrictions of cotton allotments. Depressed yields in 1951–53 resulted from expansion to lower-quality lands, less intensive cultural practices, and rather unfavorable weather. In 1954–56 cotton allotments once again forced cotton to the most productive soils and encouraged better care on a smaller acreage. Record yields resulted. The general long-time increase in cotton yields is attributed to increased use of fertilizer, irrigation, more effective disease and insect control, and other improved practices. Total cotton production in California closely follows acreage trends and can be explained by the interaction of acreage and yields.

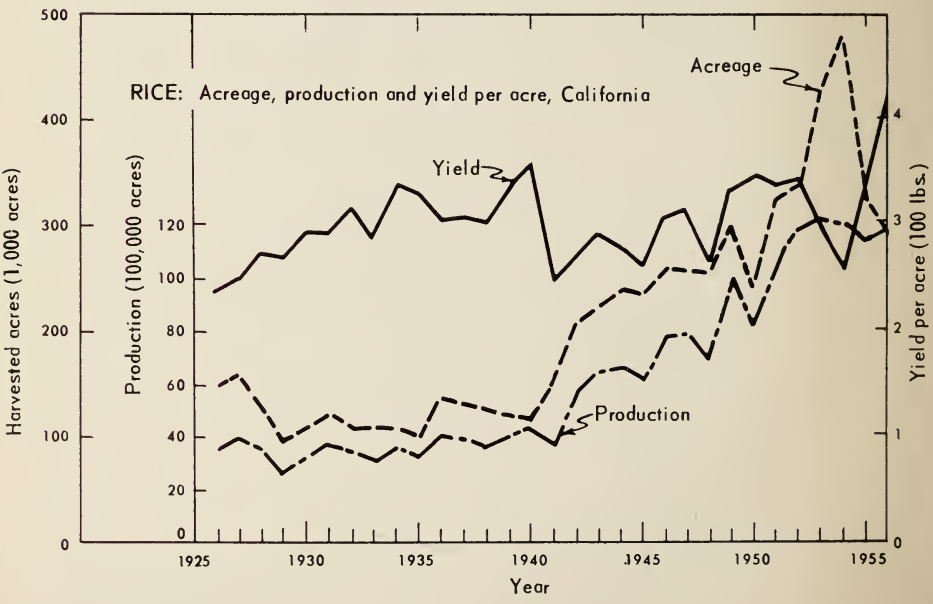
RICE

Changes in acreage

The three main rice-growing regions of the U. S. are 1) the prairie region of southwestern Louisiana and southeastern Texas, 2) the prairie region of eastern Arkansas, and 3) the Central Valley of California. In the past, California produced about one fifth of the U. S. supply of rice. Most of the California acreage is confined to the lower Sacramento Valley, where soil and climate are well adapted to rice culture. The heavy clay soils of the Sacramento Valley require relatively less water for flooding, and dry out quickly after draining, thereby facilitating harvest with heavy equipment. Relatively level land allows large checks and efficient use of machinery in this highly mechanized industry. Ample low-cost water, good drainage, and hot summers also favor rice there. Most of the commercial rice grown in California is of the high-yielding, short-grain variety. Short-grain rice is better accepted in foreign markets (Puerto Rico and the Far East, for example) than in the domestic market. Only about 10 to 20 per cent of the California crop is used domestically.

Commercial rice production began in California in 1912 and increased rapidly during World War I. In the inter-war period, California rice acreage was maintained at about 100,000 to 150,000 acres. Both the U. S. and California rice industries expanded during and after World War II. War in the Far East severed main rice trade routes and encouraged rice production in the United States. Wartime exports to allies and postwar relief shipments to distressed nations were heavy. By the early fifties, however, rice production in foreign countries had





largely recovered and prices in the world market dropped. Consequently, acreage allotments were imposed in the United States beginning in 1955. The peak acreages of 1953 and 1954 were, in part, the result of growers' attempts to obtain acreage "history" as allotments threatened.

Shifts in location of production

The important rice-producing counties in the Sacramento Valley are Butte, Colusa, Glenn, Sutter, and Yolo; Yuba and Sacramento counties have been less important. Several counties in the northern San Joaquin Valley (principally San

Joaquin, Merced, and Fresno counties) have increased rice acreage in recent years. Kern County (Buttonwillow area) rice acreage increased sharply in 1954, and has since been relatively important. Most of the large war and postwar increases in California rice acreage, however, have been in the well-adapted Sacramento Valley area. High prices and the threat of acreage allotments brought on large-scale land reclamation in the Sacramento Valley in 1954. In the San Joaquin Valley, rice was grown on some poorer soils. Large quantities of water were applied to these soils to leach out salts. Rice was grown on many of these soils during the leaching process. Allotments sharply reduced acreage in both areas in 1955 and 1956.

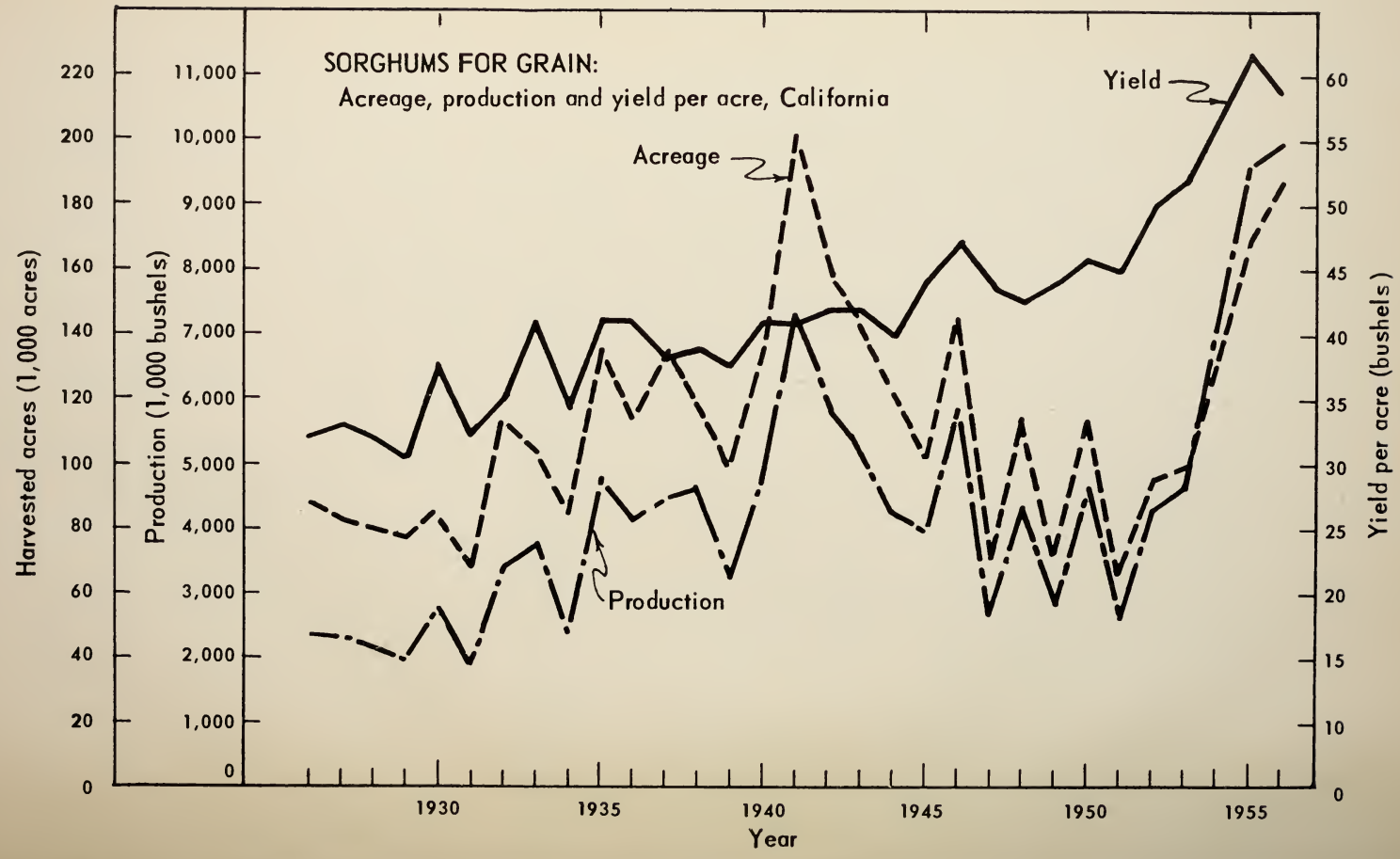
Trends in yields and production

Rice yields in California have been highly variable, with little uptrend, if any, until 1955 and 1956. Yield variability is highly associated with weather; temperatures during pollinization are particularly critical. For example, low yields in 1953–54 were partly attributable to low summer temperatures and delayed maturity. Maturity delays have also resulted from the colder water supplied from operation of the Shasta Dam. This phenomenon is particularly critical in checks near the irrigation inlet. Another yield-depressing factor in 1953 was a serious leaf miner infestation. Major factors in the 1954 yield decline were the expansion of rice acreage to poorer soils and the inclusion of inexperienced growers. The 1955 and 1956 yield increases reflect reverse shifts. Total rice production in California has followed the general upward trend in acreage since 1940. Yield increases in 1955 and 1956 nearly offset the sharp drop in acreage, with the result that production was maintained almost at the peak 1953–54 levels. Nitrogen placement, green manuring, more timely field operations, and better soil management have contributed to yield increases in the last two years and are expected to be of increasing importance as approved practices are adopted more widely.

GRAIN SORGHUMS

Grain sorghum was introduced early into California, mainly as a dryland crop in many areas of the interior valleys. More recently, grain sorghum has been a high-producing irrigated summer crop. In double-cropping plans, grain sorghum may follow barley in the Sacramento Valley or early potatoes in Kern County. California now ranks third or fourth in production of grain sorghum, its position changing from year to year. However, the Texas–Oklahoma area far surpasses California in total acreage and production. Yields in irrigated areas of California are about double those in the major dryland producing areas, but costs are considerably higher. In addition, there are fewer possible alternatives to grain sorghum in the major producing areas outside California.

Grain sorghum acreage in California remained at about 80,000 acres in the late twenties, rose through the thirties, and reached a peak of 204,000 acres in 1941. Acreage declined through the forties, and after 1953 increased rapidly. Acreage allotments for cotton since 1954 have brought major shifts to grain sorghum as well as to other crops. Preliminary figures for 1957 indicate the


SORGHUMS FOR GRAIN:
Acreage, production and yield per acre, California
Yield
Acreage
Production
Harvested acres (1,000 acres)
Production (1,000 bushels)
Yield per acre (bushels)
Year
0
20
40
60
80
100
120
140
160
180
200
220
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
11,000
10
15
20
25
30
35
40
45
50
55
60
1930
1935
1940
1945
1950
1955

highest California acreage of grain sorghum recorded since 1918, when the series began. Year-to-year variability in grain sorghum acreage is extreme. Diseases—for example, root rot in the thirties—have been a contributing factor in acreage fluctuations. In addition, late spring rains often delay the planting of other crops, and grain sorghum is planted as a substitute.

Grain sorghum is grown widely in California. The acreage is considerable in the Sacramento Valley (Yolo County, Sutter Basin, and Butte County). Recent development of an adapted variety—Ryer 15—has increased grain sorghum acreage in the rice areas; the timing of operations for sorghum and rice production fit well together. Grain sorghum is also found on the fringes of the Sacramento–San Joaquin Delta area. However, the big increase in recent years has been on land diverted from cotton on the west side of the San Joaquin Valley. Grain sorghum acreage in the Imperial Valley and Blythe area has declined sharply since about 1953–54, as a result of failure of seed set.

Grain sorghum yields have generally increased since the late twenties. Development in the late thirties of the disease-resistant Double Dwarf 38 variety apparently helped reduce annual yield fluctuations. The general rise since is primarily the result of improved production practices, including greater nitrogen fertilization in recent years. Since 1950, yields have increased sharply as new growers gained experience with sorghum and as more acreage was planted on productive cotton land. Despite the upward trend in yields, total production has closely followed the year-to-year acreage fluctuations in California.

SUGAR BEETS

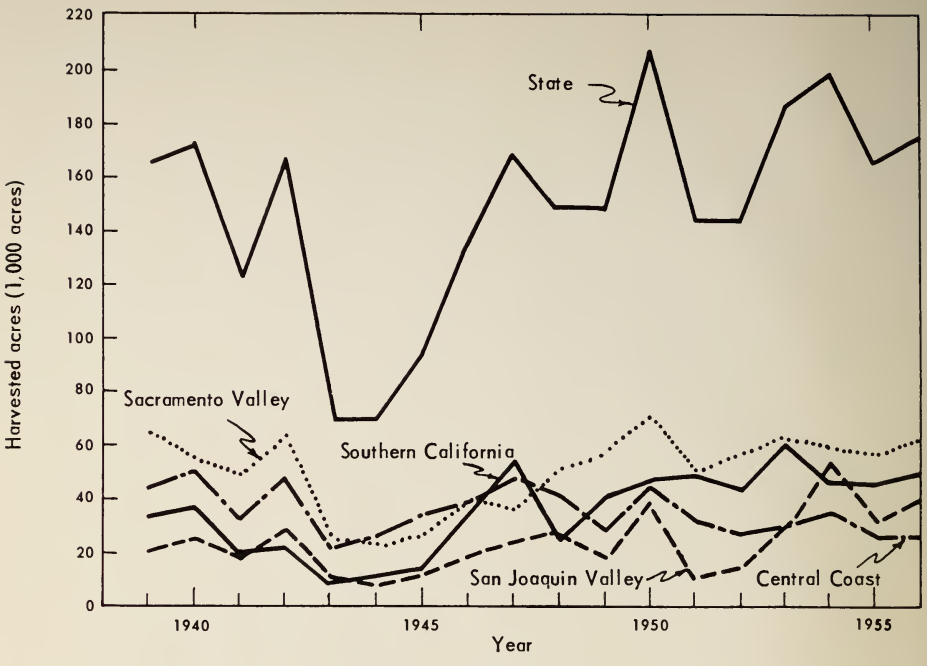
Changes in acreage

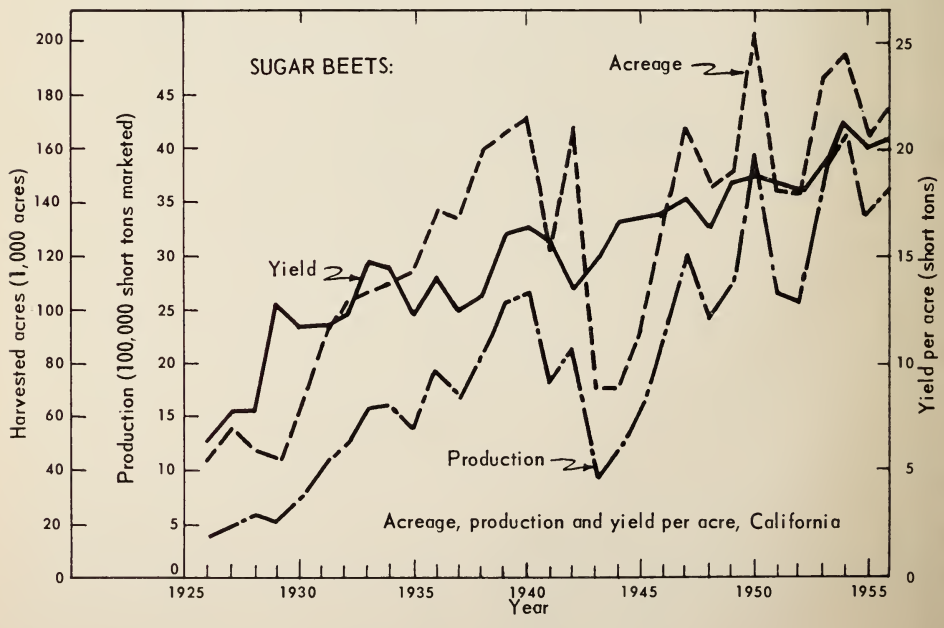
Over the years the United States government has taken positive steps—in the form of import quotas or subsidies to domestic producers—to foster development of the domestic sugar industry. Since World War II, mainland production has supplied about one quarter of our sugar needs. Hawaii and Puerto Rico supply roughly another quarter, while Cuba and the Philippines supply the remaining half. About three fourths of U. S. domestic sugar production comes from sugar beets; the rest is from sugar cane. Beet sugar is produced in some 16 states; domestic cane-sugar production is concentrated in Louisiana and Florida.

Early growth in the beet sugar industry was in the northern Midwest and Great Plains, where freight rates from distant cane sugar sources were high. Since 1930, however, the location of acreage and production has changed significantly. Planted acreage in the West increased 12 per cent from 1938–40 to 1952–54; acreage in the central and eastern regions of the U. S., respectively, declined 15 and 56 per cent in the same period. Because yields are higher in the West, the shift in production has been even greater. High yields, along with larger farms and increased mechanization, have permitted relatively efficient production and processing in the western region.

Expansion in sugar beet acreage in California accompanied the general shift

SUGAR BEETS: Acreage by districts, California





in production to the west coast. California is now the major sugar beet state, producing over 25 per cent of total U. S. tonnage. A principal factor limiting California sugar beet acreage in the twenties was the virus disease curly top, transmitted by the beet leafhopper. Development of resistant varieties and control by spray programs raised yields and undoubtedly encouraged expansion in acreage. A sharp dip in acreage in 1943–45 was caused by wartime shortages of labor. After the war, acreage expanded sharply, reaching a peak in 1950. Mechanization of the harvest contributed to this expansion. Acreage allotments for competing crops, particularly cotton, have influenced sugar beet acreage. For example, the 1950 peak in sugar beet acreage coincided with acreage allotments for cotton. In 1951, cotton allotments were removed and sugar beet acreage dropped. Acreage in 1955 was limited through control of contracts by processors, who had carried over substantial inventories from the 1954 crop and were marketing under federal quotas.

Shifts in location of production

Though the location of acreage in the U. S. has shifted markedly, production patterns in California have been relatively stable. Sugar beets are produced in three dominant areas: 1) Yolo, Solano, and Sacramento counties, in the Sacramento Valley, plus adjacent San Joaquin County, in the San Joaquin Valley, 2) Alameda, Santa Clara, San Benito, and Monterey counties, in the Central Coast area, and 3) Imperial Valley, in southern California. In 1955, these areas respectively accounted for 35, 15, and 23 per cent of the total state acreage. Acreage increases in Imperial Valley since World War II account for southern California's increasing relative importance in recent years.

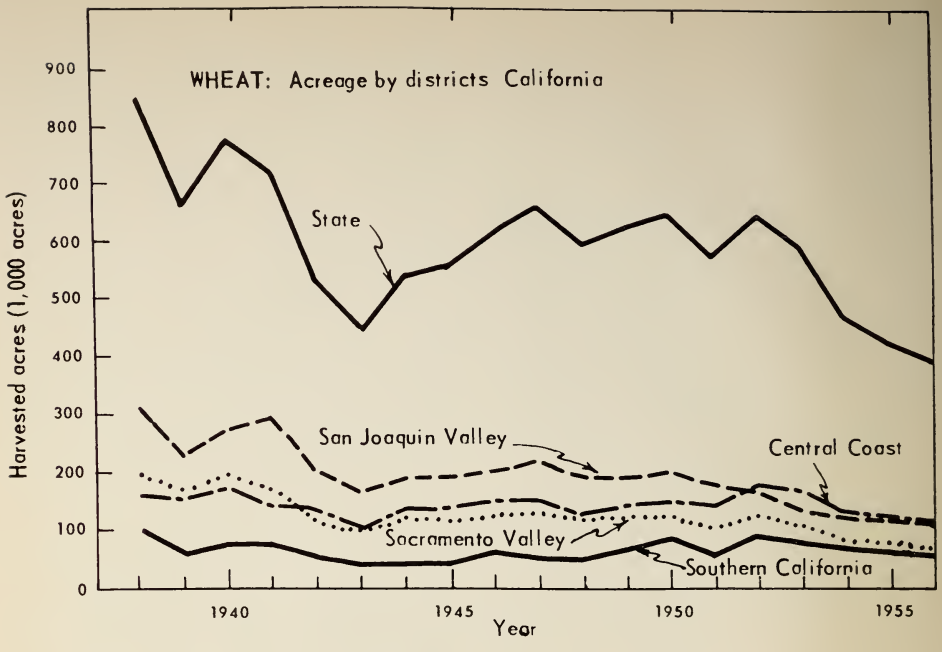
Trends in yields and production

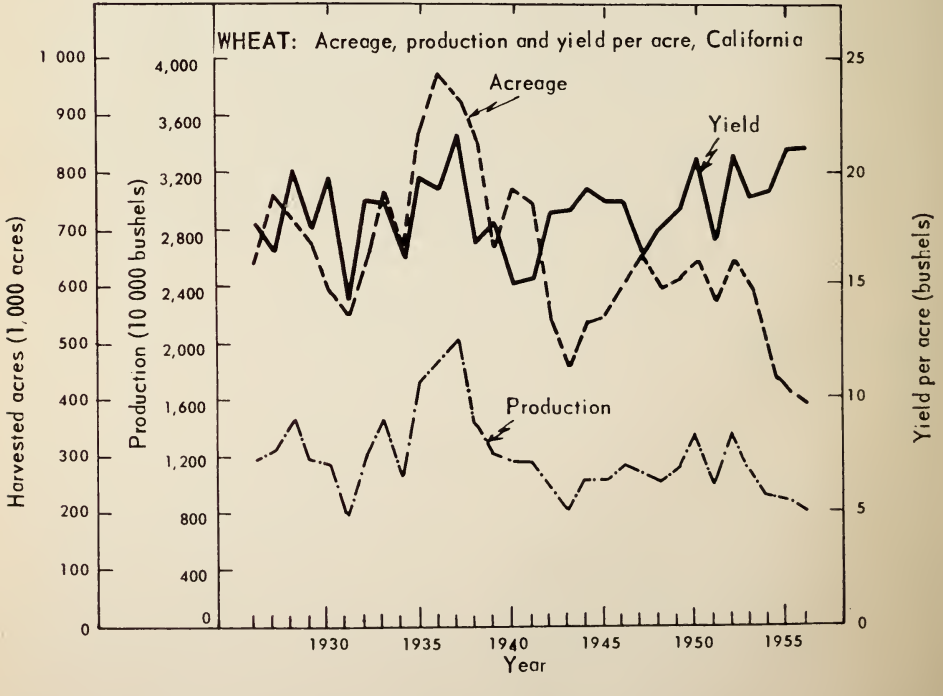
Yields rose sharply in the early thirties as curly-top-resistant varieties and insect control sprays were developed and adopted. A more gradual increase in yields since the mid-thirties is attributed to increased fertilization rates, particularly nitrogen, and general improved cultural practices. As a result, total production has also risen, but with major fluctuations accompanying year-to-year acreage changes since 1940.

WHEAT

Changes in acreage

In the main, California grows soft white wheat varieties, used primarily as livestock and poultry feed. Wheat is a fairly important field crop in some areas, but total state acreage and production are an insignificant portion of the U. S. total (about one per cent by value in 1954–55). During the latter half of the nineteenth century, in contrast, wheat was California's foremost crop. In 1890, California was the second-largest wheat-producing state, annually averaging 40 million bushels; the recent state average is around 10 million bushels. The major decline occurred between about 1900 and 1913, when much of the wheat plantings were replaced by barley. California barley then brought high premiums in England because of its exceptional malting qualities. Wheat acreage in California has varied considerably since World War I, but without regaining its former im-


WHEAT: Acreage by districts California
Harvested acres (1,000 acres)
900
800
700
600
500
400
300
200
100
0
State
San Joaquin Valley
Central Coast
Sacramento Valley
Southern California
1940
1945
1950
1955
Year


WHEAT: Acreage, production and yield per acre, California
Harvested acres (1,000 acres)
1 000
900
800
700
600
500
400
300
200
100
0
Production (10 000 bushels)
4,000
3,600
3,200
2,800
2,400
2,000
1,600
1,200
800
400
0
Yield per acre (bushels)
25
20
15
10
5
0
Acreage
Yield
Production
1930
1935
1940
1945
1950
1955
Year

portance. Competition from barley in dryland areas and from irrigated crops in others has restricted acreage in more recent years. Wheat acreage allotments in 1954–56 forced wheat acreage in California to the lowest average of three consecutive years since acreage was first recorded, in 1866.

Shifts in location of production

Some wheat is grown in almost every county of California. As late as the twenties the major proportion of the state wheat acreage was in the Sacramento Valley and northern San Joaquin Valley. Later, the San Joaquin Valley became the major wheat-producing area. Wheat in the Central Valley is now confined primarily to the dryland-farmed foothill areas. In both the San Joaquin Valley and Sacramento Valley, acreages have declined since 1938. In most areas barley has proved to be a higher-yielding and more profitable crop. In the irrigated areas, wheat has been replaced by beans, grain sorghums, alfalfa seed, and other higher-income crops. On the other hand, wheat acreages in the Central Coast (mainly the Carriso Plains area of San Luis Obispo County, where higher-protein wheat can be produced) and in southern California (mainly the higher-altitude areas) have held up well in the last fifteen years. The primary reason for the relatively constant wheat acreage in these areas has been a lack of profitable alternative uses for the land.

Trends in yields and production

Wheat yields in California have shown considerable year-to-year variability but no general long-time trend. Location of production has moved enough that it is difficult to attribute yield fluctuations to specific changes in variety or practices. Since wheat is a dryland crop, annual rainfall plays a major role in determining yields. Diseases such as yellow dwarf have also been important determinants of yields in particular years. Recent development of rust-resistant varieties may reduce yield fluctuations and raise the level of yields slightly in the next few years. In general, total production has declined in recent years along with acreage.

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